Kinemetrics Rockhound User Manual

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1. Introduction

This manual covers the Kinemetrics Rockhound software.

General Information

Rockhound is a product designed to process data from one or more digitizers, performing the functions on that data that are needed by the end user. These functions can include among many other capabilities:

- Continuous recording
- Triggered event recording
- Storage management
- Telemetry reformatting and relaying
- Data delivery
- Data post processing

Rockhound is delivered in primarily three forms:

- As a turn-key low power hardware and firmware package
- As a turn-key high capability hardware and firmware package
- As a firmware only product

Contact Kinemetrics to determine which Rockhound product best suits your particular needs.

The Rockhound firmware design is highly modular. These modules may be connected together in many different ways. Written in Java, the firmware can also be run on a variety of platforms, including MicroSoft's Windows Operating Systems, Sun MicroSystems' Solaris Operating System, and the Linux Operating System.

Contact Kinemetrics for further information on compatibility of Rockhound with other platforms.

This modular approach also provides other significant benefits:

- New Rockhound modules can be created and added with little or no impact on the rest of the Rockhound system.
- Rockhound modules can often be tested in near isolation, improving the speed and accuracy of testing.

Definitions

The following terms are used throughout this manual:

SMARTSID - The SMARTSID is a unique name assigned to this unit. The name is stored in hardware.cfg so that it is kept separate from parameters that might be shared with other units.

Broadcast - A method of notification that allows a Rockhound module to transmit a notification that something has occurred. One or more listening modules may then act upon the broadcast, or the broadcast may be ignored. An example would be event notification through pager or e-mail, where the "event start" and "event end" notifications are broadcast by the EventRecorder module but whether or not these notifications are acted upon depends on what modules have been included to handle that notification. (See the section on User Notifiers).

Command Console - The Command Console is a special Rockhound Module that is required in all Rockhound Layouts. The console is used to allow other computers to connect to Rockhound at a specific IP Port for the purpose of sending operational instructions to Rockhound. (See the section on the Command Console later in this manual)

Data filters - Data filters are used to process the data stream for the purpose of altering the data before recording or transmission. A data filter differs from a trigger filter in that a trigger filter affects only a trigger but does not affect the recorded data itself. Data filters are generally implemented using a plug-in mechanism, and consists of a data processing activity for doing the filtering. Data filters as used in plug-ins can consist of multiple filtering stages. Data filters are usually used for anti-alias filtering, or to reduce the sample rate (and thus the volume of the data) before storage or transmission.

Dialog - A dialog is a window that pops up during use of a program. A dialog is usually used to allow the user to make a choice, such as selecting between several available options. Dialogs can be as simple as an "Are you sure you want to do this?" choice, to something as complex as a complete review of configuration settings.

DigitizerId - A digitizer name used to identify data as it flows through Rockhound. This is an internal name that is used only within Rockhound to route data from one of perhaps several digitizers through the different parts of the Rockhound firmware. If several units have the same layout, with the same type and number of digitizers, they may all use the same DigitizerIDs internally. This may help aid the user in sharing configuration information between multiple units that are otherwise identical.

Firmware - In general, firmware is dedicated software that is stored in solid state devices, within an instrument or appliance. In the context of Rockhound, "firmware" is used to refer to the software that actually runs on Rockhound itself to help differentiate it from other software such as KMI's ROCKTalk or other third party software. (See Software).

GUI - Graphical User Interface. A user interface based on graphical (not simply text based) and usually mouse driven designs. The most common example is a "Windows" program with its menus, tool bars, and push buttons versus the old style "DOS" programs with entirely text mode interfaces.

IP Address - An "Internet Protocol" address, which defines a computer uniquely on the Internet or on a Local Area Network. IP Addresses usually have the form xxx.xx.xx.xx, such as 127.0.0.1. The address 127.0.0.1 is a special address that a computer may use to refer to itself.

IP Port - A data path within an "Internet Protocol" connection. Typically, one IP Address will be accessed at many IP Ports. IP Ports 5000 and below are defined for standard purposes such as Telnet, E-mail, and FTP. IP Ports above 5000 can be defined as needed by programs such as Rockhound. Rockhound requires the use and definition of several IP Ports, each of which is defaulted to a value that should be useable in most applications. Typically, Rockhound IP Port defaults are 9000 and above.

JAR - A JAR file is a facility provided by the Java programming language for putting several files together into one file for compression and/or ease of handling. In many ways, JAR files are similar to ZIP files that have been used for years by PC users. The difference is that JAR files will work the same way on different computing platforms just as the Java language will.

Java - A language developed by Sun MicroSystems, Inc. that allows programs to be written once, and with some care in the design, to be run on any computing platform for which there is a JVM available (see below). Kinemetrics has chosen to write the Rockhound firmware and software in Java so that Rockhound may be run on Linux, Windows, Solaris, and other computing platforms.

JVM - Java Virtual Machine. The JVM is a software layer that provides the interface between a Java program and the host operating system. Running any Java program requires the installation of the appropriate JVM.

Layout - A collection of modules included in a unit. Which modules are used, how many of each type are used, and how the modules are connected to produce the desired results are all defined by the layout.

Module - In general, a portion of a larger whole. In the context of Rockhound, a Rockhound module (or sometimes simply "module") is a portion of the Rockhound firmware with very specific responsibilities. Modules of differing types are combined to process data through Rockhound and for side calculations such as triggering.

Plug-in - A Plug-in is a method of data handling within a Rockhound module that supports optional data processing methods. A plug-in is not a Rockhound module, and is usually used for higher data rate activities such as data filtering. Plug-ins are an advanced topic, and are more complex than configuring and operating basic Rockhound. See Plug-in Files and Plug-in Layout Files sections.

Publication - The Rockhound firmware is primarily designed around a "publication/subscription" model. This means that most modules take data in from one or more modules elsewhere in Rockhound layout that they have "subscribed" to. Data coming from other sources that this module has not subscribed to is ignored. Once processed, a module will generally "publish" results for consumption by still other modules.

Reply - The returned results of a Request. See "request".

Request - A special variation of the subscription/publication interface that allows a module to make a specific request for information, and to have the results of that request returned via a "reply". In Rockhound, the best example of this "request/reply" method is the interface between a DataIntegrator which contains the pre-event memory buffers and an EventRecorder, that once triggered, will request the data to be recorded.

Rockhound - The library of Kinemetrics Rockhound code that can be assembled to provide great flexibility.

Software - In general, software is a set of instructions to a computer. When users think of software, they tend to think of software stored on hard disks or other such media. In the context of Rockhound, "software"

is not used to refer to the software that actually runs the unit, but to user interface software such as ROCKTalk or to other software for processing or handling the resulting data. (See Firmware)

Subscription - The primary method used for Rockhound modules to accept data from other Rockhound modules. See "publication".

Unit - A target hardware platform, either provided by Kinemetrics or by the customer that is used for running the Rockhound firmware. In many cases, this is a box in the field.

Widget - A widget is a component of a GUI display. Widgets can include buttons, checkboxes, pull-down lists, text areas, scroll bars, and other items.

Overview

The Rockhound firmware and software model consists of the following components:

- **The Operating System:** This is the basic computer software that provides the management of the computer's services. Because Rockhound is written in Java, Rockhound is not limited to any one Operating System. Rockhound code will run on multiple Operating Systems. Contact Kinemetrics for a complete list. The Operating System is typically a separate commercial product that must be purchased or obtained separately.
- **The Java Virtual Machine, or JVM:** The JVM provides the environment in which the compiled Java code of Rockhound operates. The JVM isolates the Rockhound code from the details of the particular computer or Operating System employed. As of this writing, Rockhound is written for Sun's 1.4 JVM or later.
- **The Rockhound Firmware:** This is the firmware that performs the actual functions of the unit. The exact functions depend on what modules were selected and how the modules were connected. This firmware will be updated by Kinemetrics regularly as capabilities are added to the overall Rockhound system, and as user requirements, data sources, or other factors dictate changes.
- **Rockhound Support Software:** Also written in Java, support for Rockhound includes ROCKTalk, a utility that allows the user to quickly and easily configure Rockhound for the most commonly used applications. Other support utilities are provided as well.
- **Configuration Data:** If a turn-key system is purchased, configuration data will be created for a standard implementation of Rockhound. In most cases, it will be necessary to reconfigure Rockhound using ROCKTalk to fit individual needs. If Rockhound is purchased as a firmware only package, this initial configuration information will be created by the end user.

Rockhound is made up of modules that process data flowing through Rockhound in a uniform way. These modules may be connected to one another to split, combine, process, record, or transform data using a number of different methods.

The Basics of Rockhound Modules

Rockhound modules communicate with each other using a very standardized interface. In general, a Rockhound module sends and/or receives data and messages to or from other Rockhound modules.

The examples in the following section are intended only to introduce the general concept of Rockhound modules. The details of modules are described later in the manual in a section that addresses each module.

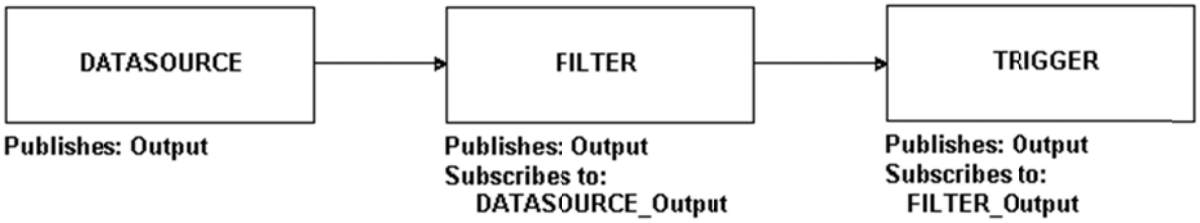
Most modules are optional depending on the application. Two module types however, the CommandConsole and the UpdateMonitor, are required in all Rockhound layouts and are included automatically whenever a Rockhound layout is created. These two modules are not described in this introductory section.

A Rockhound module **Publishes** output data or messages to other Rockhound modules interested in its output.

A Rockhound module **Subscribes** to data or messages from other Rockhound modules that it wants data from.

For example, here's a simple example of three modules:

- DATASOURCE is a source of unfiltered data
- FILTER is a module that filters the data in some way
- TRIGGER is a trigger acting on the filtered data



Basic Module Relationships

For each module in the Rockhound configuration, the module layout file **layout.cfg** defines the type of module, the name of the module, any publications of the module (Output is assumed), and any subscriptions the module uses. Note that a module may publish multiple messages for use by various subscriber modules, and a module may subscribe to multiple messages from other modules.

In addition, each module has a configuration file that defines the value of any parameters used by the module. In most cases, parameters of a module are only of interest to one particular module, and if shared outside of the module at all are only shared on an as-needed basis.

For example, a threshold trigger module will define parameters for the trigger level, detrigger level, and number of votes for that stream of data in its configuration file. If the module is named **Channel1Trigger,** then the configuration file will be called **config/Channel1Trigger.cfg.**

Each module is assigned a debugging level. This is a hexadecimal bit mask for each module in the layout. The debugging bits are used for Kinemetrics' internal testing and debugging, and are not intended for use by the customer. Debugging information is stored in the file **debug.cfg.**

Rockhound wide parameters, those that are expected to be used by multiple modules within the Rockhound system, are stored in **smarts.cfg.** This file would hold parameters such as the identifying name of the unit, plus widely needed parameters such as PreEvent and PostEvent time if Rockhound is being used for event recording.

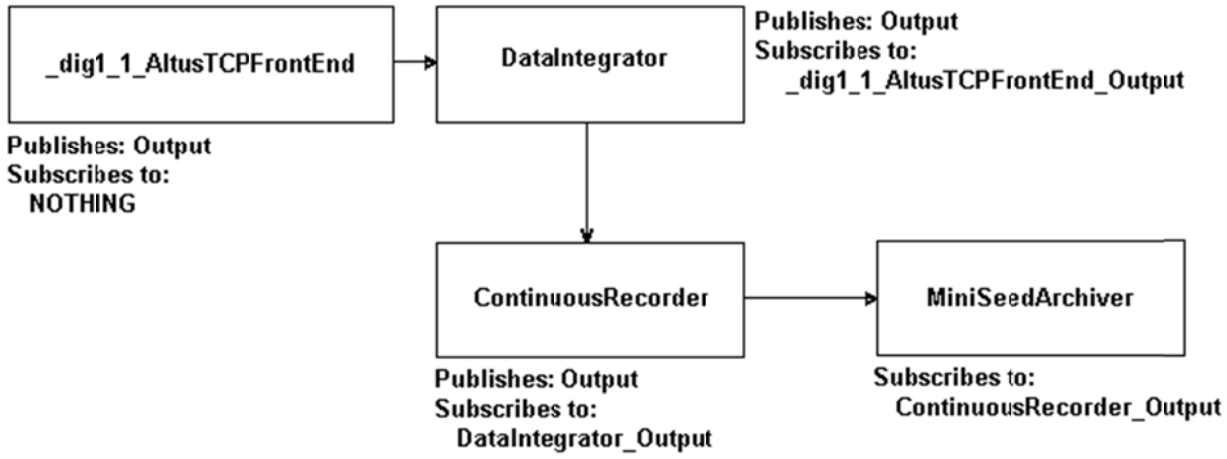
Lastly, hardware specific parameters are stored in the configuration file **hardware.cfg.** This file is used to hold values that are unique to a particular set of hardware, and would include such things as serial numbers, channel counts, sensor types, calibration values, and other things that are particular to a given set of hardware.

The idea is to separate the hardware specific parts of the configuration from those that are not hardware dependent, so that common Rockhound configurations can be used at multiple sites having similar overall requirements.

A More Complete Example - Continuous Recording

OK, we've reviewed the basics of how Rockhound modules hook together, so let's look at a more realistic, but still relatively simple example. Let's look at a Rockhound configuration with the following characteristics:

- Input data source is a Kinemetrics Altus recorder used as a digitizer (sample rate unimportant for this example)
- Data is to be recorded continuously in 15 minute (900 second) files
- Data is to be stored in MiniSEED format



A Simple Continuous Recorder Example

As shown, data flows from the data source, to the continuous recorder module that is responsible for gathering all of the data from the data source and neatly dividing it into 15 minute (900 second) segments. The data is then in turn passed to the Archiver that is responsible for formatting it in the selected style - in this case MiniSEED format.

The **layout.cfg** file that describes this simple configuration appears as follows:

```
Type=AltusTCPFrontEnd
Name=_dig1_1_AltusTCPFrontEnd
SubscribesTo=NOTHING

Type=DataIntegrator
Name=DataIntegrator
SubscribesTo=_dig1_1_AltusTCPFrontEnd_Output

Type=ContinuousRecorder
Name=ContinuousRecorder
SubscribesTo=DataIntegrator_Output

Type=MiniSeedArchiver
Name=MiniSeedArchiver
SubscribesTo=ContinuousRecorder_Output
```

The **smarts.cfg** file that describes this configuration would contain no data, and be blank.

The **hardware.cfg** file that describes this configuration appears as follows:

```
SMARTSId=KMI
NetworkId=KMI
NChannels=3
dig1.Name=dig1
dig1.TCPPort=9001
dig1.Host=127.0.0.1
dig1.ch1.Id=C1
dig1.ch2.Id=C2
dig1.ch3.Id=C3
RetrySeconds=300
```

The various module specific configuration files appear as follows:

_dig1_1_AltusTCPFrontEnd.cfg - Reads SDS data from an Altus digitizer

```
Compress=true
Channels=1,2,3
NDigitizerChannels=3
DigitizerId=dig1
SPS=100
Buffer=64
```

ContinuousRecorder.cfg - Multichannel data recorder (format independent) that records continuously

```
FileDurationSec=900
```

MiniSeedArchiver.cfg - Data output formatter that records the data in MiniSeed format

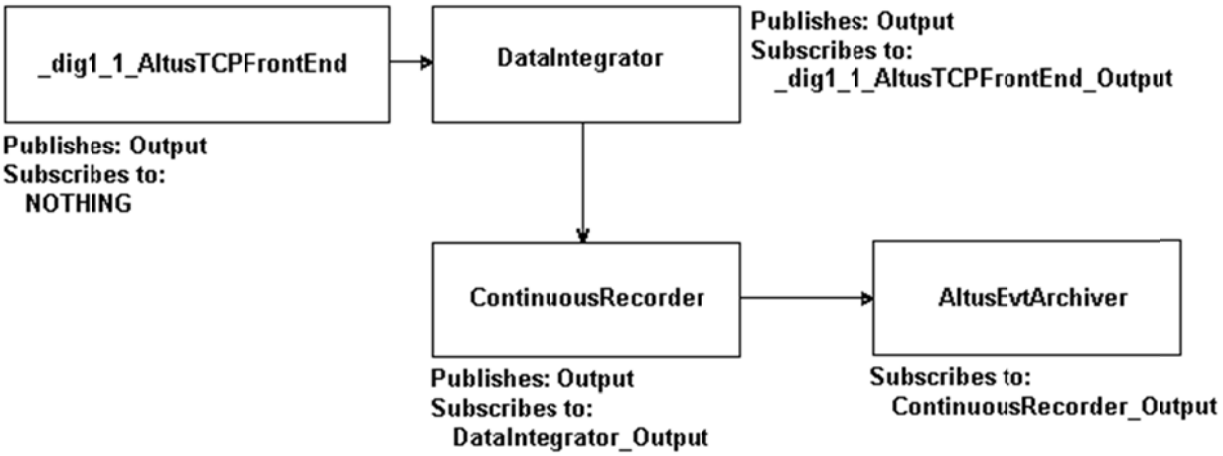
```
Channels=*
ScaleDivisor=1.0
DirLayout=FLAT
OutputDir=\\data\\events\\
```

DataIntegrator.cfg - The DataIntegrator queues up the data for a channel, time aligns samples from multiple digitizers, and sends it to the data stream.

```
InputPluginLayout=NONE
```

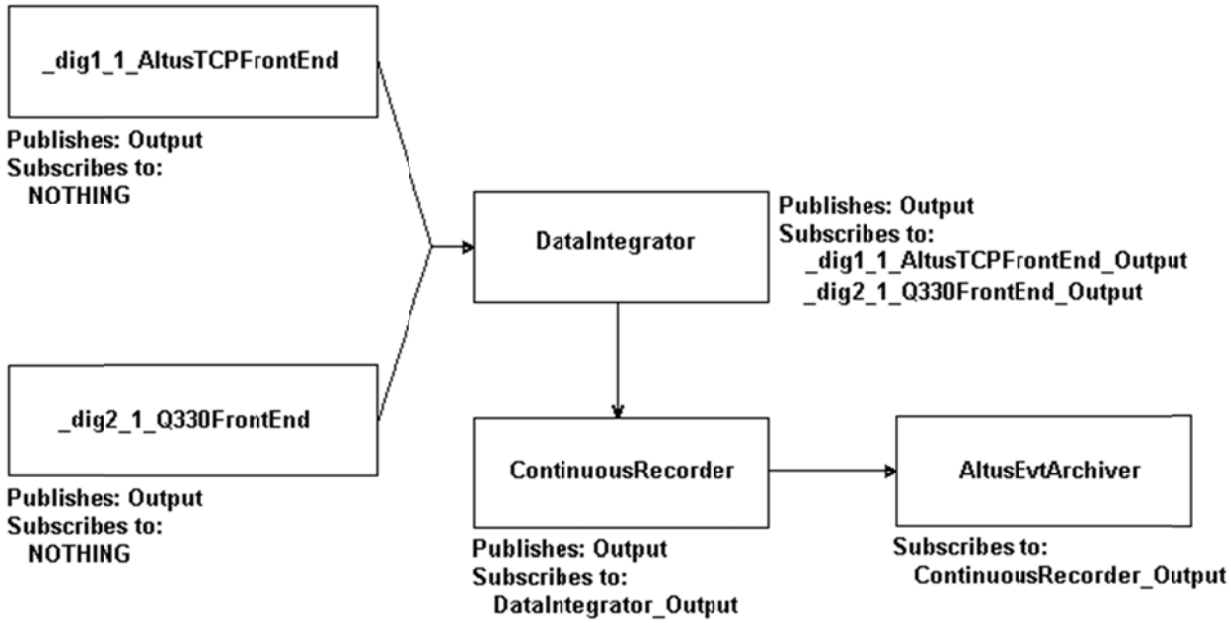
Several modifications to this layout are possible within the basic idea of continuous recording. Two simple examples would be:

Changing the archiver for another type so that data could be stored in Kinemetrics EVT format, SAC format, SUDS format, or something else:



A Continuous Recorder Storing Data as EVT Files

Adding a second front end so that data can be gathered from two digitizers (not necessarily transmitting data at the same sample rate):



A Continuous Recorder From Two Front Ends

Note 1: For a description of the meaning of each configuration variable in the examples, see the documentation later on in this manual that describes the available modules and their configuration options.

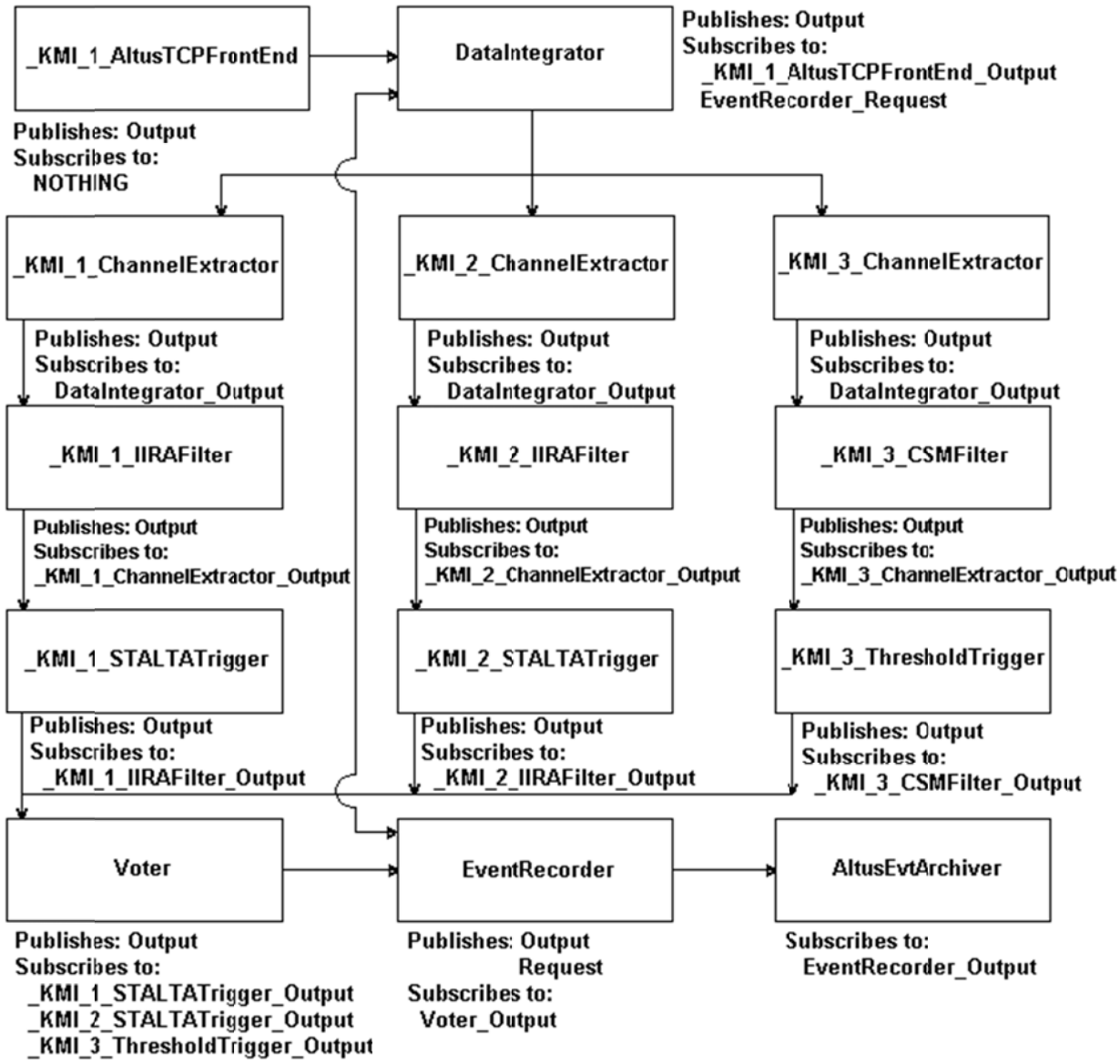
Note 2: These are relatively simple configurations. Much more complex configurations are common. We will look at other examples later on. The process of creating most common configurations is automated by the ROCKTalk program, so increasingly complex examples should not be cause for concern.

A More Detailed Example - Event Triggered Recording

Event triggered recording results in a more complex example, because in addition to the requirement for a data source, a data integrator, and a format specific archiver, we now need to add trigger filters, triggers, a voter, and an event recorder that can deal with pre-event and post-event memory.

In this example, we'll create a configuration with the following characteristics:

- Input data source is a Kinemetrics Altus recorder used as a digitizer (again, sample rate is not important for the purposes of the example)
- IIR-A trigger filters are used on channels 1 and 2
- A Kinemetrics "Classic Strong Motion" trigger filter is used on channel 3
- STA/LTA triggers are used on channels 1 and 2
- A threshold trigger is used on channel 3
- Two votes are required to trigger the system
- Ten seconds of pre-event memory is used
- Thirty seconds of post-event memory is used
- Data is to be stored in Kinemetrics EVT format



A Basic Event Recorder Example

Note here that the data stream is split from the DataIntegrator into three channel streams by the ChannelExtractors. From there, each channel stream is passed through a Filter, and then through a Trigger. The output of the Triggers are all sent to the Voter, who will indicate start of recording to the EventRecorder. The EventRecorder makes data requests back to the DataIntegrator that provides adequate buffering to provide for pre-event and post-event memory. The returned data is then sent on to the AltusEvtArchiver for storage in the desired format.

Realistically, it would probably be more natural to use similar filters and trigger methods on all channels, but this example demonstrates Rockhound flexibility.

The **layout.cfg** file that describes this configuration appears as follows:

```
Type=AltusTCPFrontEnd
Name=_kmi_1_AltusTCPFrontEnd
SubscribesTo=NOTHING

Type=DataIntegrator
Name=DataIntegrator
SubscribesTo=_kmi_1_AltusTCPFrontEnd_Output EventRecorder_Request

Type=ChannelExtractor
Name=_kmi_1_ChannelExtractor
SubscribesTo=DataIntegrator_Output

Type=IIRAFilter
Name=_kmi_1_IIRAFilter
SubscribesTo=_kmi_1_ChannelExtractor_Output

Type=STALTATrigger
Name=_kmi_1_STALTATrigger
SubscribesTo=_kmi_1_IIRAFilter_Output

Type=ChannelExtractor
Name=_kmi_2_ChannelExtractor
SubscribesTo=DataIntegrator_Output

Type=IIRAFilter
Name=_kmi_2_IIRAFilter
SubscribesTo=_kmi_2_ChannelExtractor_Output

Type=STALTATrigger
Name=_kmi_2_STALTATrigger
SubscribesTo=_kmi_2_IIRAFilter_Output

Type=ChannelExtractor
Name=_kmi_3_ChannelExtractor
SubscribesTo=DataIntegrator_Output

Type=CSMFilter
Name=_kmi_3_CSMFilter
SubscribesTo=_kmi_3_ChannelExtractor_Output

Type=ThresholdTrigger
Name=_kmi_3_ThresholdTrigger
SubscribesTo=_kmi_3_CSMFilter_Output

Type=Voter
Name=Voter
SubscribesTo=_kmi_1_STALTATrigger_Output _kmi_2_STALTATrigger_Output
_kmi_3_ThresholdTrigger_Output

Type=EventRecorder
Name=EventRecorder
SubscribesTo=Voter_Output

Type=AltusEvtArchiver
Name=AltusEvtArchiver
SubscribesTo=EventRecorder_Output
```

The **smarts.cfg** file that describes this configuration appears as follows:

```
PreEventSec=3
PostEventSec=10
```

The **hardware.cfg** file that describes this configuration appears as follows:

```
SMARTSId=KMI
NetworkId=KMI
NChannels=3
kmi.Name=dig1
kmi.TCPPort=9001
kmi.Host=127.0.0.1
kmi.ch1.FullScaleADCCounts=8388608
kmi.ch2.FullScaleADCCounts=8388608
kmi.ch3.FullScaleADCCounts=8388608
RetrySeconds=300
```

The various module specific configuration files appear as follows:

_kmi_1_AltusTCPFrontEnd.cfg - Reads SDS data from an Altus digitizer

```
Compress=true
Channels=1,2,3
DigitizerId=kmi
SPS=100
Buffer=64
```

_kmi_1_ChannelExtractor.cfg - Extracts a single channel of data from multichannel output

```
ChannelNumber=1
DigitizerId=kmi
```

_kmi_2_ChannelExtractor.cfg - Extracts a single channel of data from multichannel output

```
ChannelNumber=2
DigitizerId=kmi
```

_kmi_3_ChannelExtractor.cfg - Extracts a single channel of data from multichannel output

```
ChannelNumber=3
DigitizerId=kmi
```

_kmi_1_IIRAFilter.cfg - IIR-A trigger filter

```
SamplesToSettle=3000
```

_kmi_2_IIRAFilter.cfg - IIR-A trigger filter

```
SamplesToSettle=3000
```

_kmi_3_CSMFilter.cfg - Classic Strong Motion trigger filter

```
SamplesToSettle=3000
```

_kmi_1_STALTATrigger.cfg - STA/LTA trigger to trigger recording

```
STALength=1.0
Votes=1
LTALength=60
TriggerRatio=4.0
DetriggerPercent=40.0
```

_kmi_2_STALTATrigger.cfg - STA/LTA trigger to trigger recording

```
STALength=1.0
Votes=1
LTALength=60
TriggerRatio=4.0
DetriggerPercent=40.0
```

_kmi_3_ThresholdTrigger.cfg - Threshold trigger to trigger recording

```
Votes=1
TriggerThreshold=2.0
DetriggerThreshold=2.0
```

Voter.cfg - Channel voter that tallies votes from all channels to decide whether or not there has been a trigger

```
TriggerWindowMS=800
VotesToTrigger=2
```

AltusEvtArchiver.cfg - Data output formatter that records the data in Altus EVT format

```
Channels=*
ScaleDivisor=1.0
DirLayout=FLAT
OutputDir=\\data\\events\\
```

The file **EventRecorder.cfg** is empty because the EventRecorder has no parameters. The EventRecorder is a multichannel data recorder (format independent) that records a triggered event.

DataIntegrator.cfg - The DataIntegrator queues up the data for a channel, time aligns samples from multiple digitizers, and sends it to the data stream.

```
InputPluginLayout=NONE
```

Rockhound and ROCKTalk Passwords

In the following sections, you will see a lot of discussion about passwords. The Rockhound firmware, ROCKTalk, and the Q330 make use of these passwords in various ways to protect various parts of your system.

In general, passwords keep the curious or the casual hacker out of an area where they are not wanted. Passwords are not secure, but in many cases they are "good enough" given the alternatives.

In a typical Q330/Rockhound/ROCKTalk application, there may be several passwords in use at any one time. Although it is possible to eliminate many of these passwords for ease of use and leave your system "wide open", Kinemetrics does not recommend this. The other alternative is to implement all passwords and have different password values for each - this is more complex, but also probably the most secure use of passwords alone.

As an overview, the passwords available for possible use in a Q330/Rockhound/ROCKTalk application are listed here. Note that exactly which passwords you will need or use will depend on how your overall system is configured:

Q330 Serial Number - The Q330 has a long serial number, such as '01000001DEC25E78', which is part of the registration with the Q330. It is used in conjunction with the Q330 Authorization code to register with the Q330 remotely. This value is required and is unique to each Q330.

Q330 Authorization Code - The Q330 has an authorization code which is required in order to make a connection to the Q330. Computers that are to communicate with the Q330 must "register" using this code and the Q330 serial number before a connection is established. This value is required and is unique to each Q330.

Rockhound Authorization Code - Rockhound has an authorization code that is assigned by Kinemetrics and is provided either with turnkey Rockhound hardware, or for use with your computers if you are using Rockhound firmware on your own computer. Without this authorization code, Rockhound will only run in demo mode for up to 12 hours. This value is required and is unique to each unit.

Rockhound CommandConsole Password - The Rockhound CommandConsole, which is a command line interface to Rockhound, includes support for a password. Since the CommandConsole behaves very much like a Telnet connection for ease of use, it should be protected with a password. The Console password can be entered for each unit in the ROCKTalk Setup dialog to automate sending of the password to the Rockhound CommandConsole. This password is set to a default value, but use of a password is not required.

Rockhound SCP/FTP Password - Kinemetrics' Rockhound turn-key systems, which consist of Rockhound firmware loaded onto Kinemetrics' hardware, run under the Linux operating system. As Rockhound records files, they will be stored on the provided storage media. Linux provides a secure SCP server which is always enabled, and an FTP server, which can be enabled to allow users to retrieve files remotely using an FTP transfer program - including use of most popular Internet browsers. The SCP/FTP password restricts those users that can retrieve, change, or delete files. An SCP/FTP password is set by default, but is not required.

User and Root Passwords - Kinemetrics' Rockhound turn-key systems, which consist of Rockhound firmware loaded onto Kinemetrics' hardware, run under the Linux operating system. Linux provides password protected user accounts, including a "root" account for system administration activities, plus two Rockhound specific accounts that are used for execution of the Rockhound firmware and configuration of Rockhound. In addition, the user may choose to install his own accounts, which may have their own passwords. Passwords on the various Linux user accounts are set by default, but are not required.

ROCKTalk Advanced User Password - ROCKTalk allows for restriction of Advanced User features. The Advanced User password is set on the ROCKTalk Setup dialog. By default, no Advanced User password is set.

FTP Server Password - In addition to the unit acting as an SCP/FTP Server allowing remote retrieval of files, Rockhound can transmit files automatically to an FTP Server that the user has set up to accept these files. Setup and maintenance of an FTP Server is the responsibility of the user if desired. Normally, the FTP Server would have accounts and passwords to restrict reading, writing, or changing of files on the FTP Server. The FTP Server's address, account name, and password must be given to the Rockhound FTPSender module in the form of parameters. See FTPSender Rockhound module.

Default Passwords

Passwords are set for various parts of Rockhound and ROCKTalk system by default. These default passwords are listed here for your convenience in getting started. Please note that the trade-off in listing the passwords for your convenience is that these passwords are then not secure. **You are encouraged to change the passwords to private settings.**

Rockhound Administration: Account name `admin`, password `kmi` - The administration password used for firmware and configuration updates. This is the account and password that should be used as the "SCP/FTP login name and password" for ROCKTalk to communicate with Linux based hardware via SCP/FTP. This password can be changed via the Linux "passwd" command from the Linux `admin` account.

Rockhound Client: Account name `client`, password `kmi` - A client account used for READ ONLY access to the Linux based SCP/FTP server when using SCP or in the event that FTP is used and anonymous FTP access is disabled. This account has wider access than the anonymous login, and can traverse other Linux directories beyond limited to the /pub directory. To access the SCP/FTP site with write access, such as to delete files, you must log into the unit's SCP/FTP server using the `admin` account. This password can be changed via the Linux "passwd" command from the Linux `client` account.

Rockhound Command Console Password: `Q330` - The password used to control access to the Rockhound Command Console. This password must be set in two places, in the Rockhound Command Console configuration parameters and in ROCKTalk's Command Console parameter under ROCKTalk Setup.

Anonymous FTP: Account name `anonymous`, password `emailaddress` - This account is provided by default for anonymous READ ONLY access to the Linux based FTP server. To access recorded files anonymously, log into the FTP site using this account and your e-mail address as a password. To log into the SCP/FTP site with write access, use the `admin` account. Files are typically stored under `/pub/data/events/`

In higher security applications, a better protection method is use of "secure" communications functions, such as secure shell, secure telnet, and SCP. These methods are significantly more complicated, and use encryption that makes the data meaningless to anyone "sniffing" the connection, and denies unauthorized connections to your system totally.

One Final Word on the Overview

From the overview descriptions so far on Rockhound, it should be clear that Rockhound is a very flexible collection of firmware modules that can be combined in a number of ways to provide a great deal of flexibility.

The Rockhound architecture is very scalable, allowing more channels and more elaborate processing to be done, limited only by the available computing resources.

New Rockhound modules are expected to be added to the list of modules described in this manual. For specific applications, it is possible that existing modules can be combined in ways not considered, or that new modules are being designed now that do what is needed. It is also possible that a custom module could be quickly designed that would meet the exact criteria. Contact Kinemetrics for further information.

2. ROCKTalk

This chapter covers the program ROCKTalk that provides the primary user interface to Rockhound for setup and parameter editing.

ROCKTalk Overview

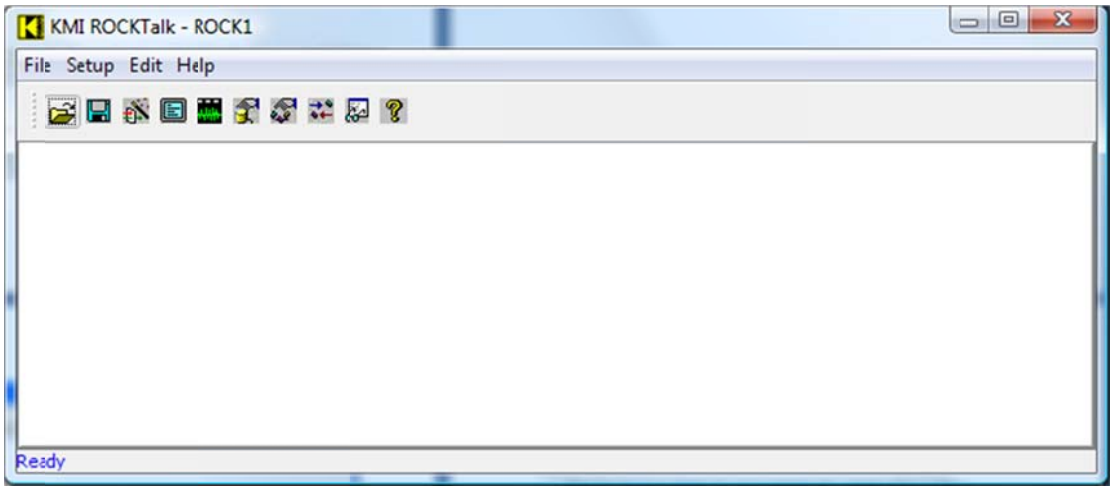
As seen from the example descriptions given in the overview, the configuration of Rockhound is done with text files, and communication with Rockhound can be done primarily through standard interfaces such as Telnet and SCP/FTP.

However, it should also be clear by now that the number of available Rockhound modules and the number of configuration options make manual configuration an intimidating prospect for anyone with better things to do than to learn all of the detailed intricacies of Rockhound internals.

For this reason, Kinemetrics developed a program called ROCKTalk.

ROCKTalk is designed to walk that fine line between hiding the complexities of dealing with Rockhound and limiting access to the power of that complexity. In other words, ROCKTalk tries to provide the best of both worlds.

ROCKTalk is written in Java like the rest of the Rockhound software. This means that ROCKTalk can be run on any computing platform that supports Java - such as the various Windows Operating Systems, Sun's Solaris, and Linux. It also means that although a unit may be running on Linux, the user can communicate with it effectively from a desktop computer running Windows.



ROCKTalk Display

Looking at the display, note the following major components of the ROCKTalk display:

- Title bar shows the name of the program (KMI ROCKTalk) and the currently selected unit
- Menu for access to functions of ROCKTalk
- Tool bar buttons for fast access to the most commonly used functions of ROCKTalk
- Scrollable text area to display status
- Status line at the bottom of the display

Notice that the title bar includes standard window functions supported by the Operating System. This display example was taken under Windows, so it includes Minimize, Maximize, and Exit buttons.

What can ROCKTalk do?

ROCKTalk has a wide variety of capabilities, most of which will be described in detail further in this section. However, here's a quick overview:

- Controls multiple units
- Remembers connection addresses
- Interfaces with remote Rockhound via SCP/FTP or a network file sharing LAN
- Layout wizard for creation of Rockhound layouts from standardized templates
- Rockhound parameter editor
- Retrieval and sending of Rockhound parameters
- Archival of Rockhound configurations for later use
- Module replacement
- Terminal window access to units
- Waveform viewer window
- Validation of Rockhound layout to make sure it is correct
- Management of Rockhound registration codes
- Firmware update of units
- Advanced functions:

    - Module delete
    - Module insert
    - Debug level control (Special advanced level only)
    - Manage plug-in layouts (Special advanced level only)
    - Module rename (Special advanced level only)
    - Subscription editing (Special advanced level only)

Menu

The ROCKTalk menu includes the following functions. Most of these functions are described further in the tool bar section, with the exception of those few infrequently used functions that are available only through the menu. These menu only functions are described here.

FILE

Open Layout - Opens a Rockhound layout, usually for editing. Layouts can be read from a unit.
Save Layout - Save a Rockhound layout. Layouts can be saved to a unit.
Archive Layout (Special advanced level only) - Archive a layout by placing all files of the layout into a JAR file for later reference.
De-archive Layout (Special advanced level only) - De-archive a layout by extracting files from a specified JAR file. De-archived layout information may be extracted with or without hardware specifics of an individual unit.
Exit - Exits from ROCKTalk.

SETUP

Layout Wizard - Creates Rockhound layouts from a list of standardized templates. Pick the basic way Rockhound should be used, and the wizard asks the questions needed to complete the layout.
Terminal Window - Opens a terminal window (via TELNET) to the selected unit.
Waveform Viewer Window - Opens a waveform viewer window that connects to the selected unit's Telemetry Connection module, if one is included in the Rockhound layout. See the description of the Waveform Viewer tool bar button, and the description of the Telemetry Connection Rockhound module.
Get Registration Info - Gets registration info from the selected unit. This function gets registration information that is used to authorize use of the main Rockhound firmware as well as additional chargeable options for Rockhound.

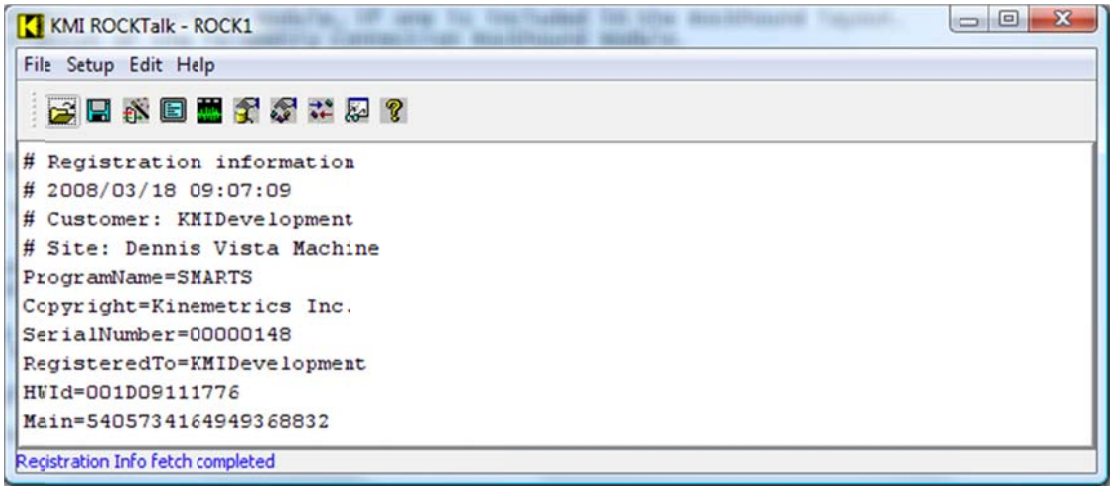
When this function is selected, a file dialog will appear that is to be used to determine where the registration information is to be stored. The registration information is stored as a .CFG file.

Kinemetrics recommends that registration information be uploaded and archived by the customer so that this information is available as a backup. Be sure to assign a unique and meaningful name to the registration data file.

This information is useful when registering new hardware, when assigning additional registration codes to Rockhound to enable additional chargeable features as well as if it should become necessary to determine the authorization status of a unit.

NOTE: Registration is not required for Rockhound when used on a Rock digitizer such as a Granite.

In addition to the creation of the registration file, the registration information is displayed in the center window of ROCKTalk:



Registration information

Send Registration Info - Sends registration info to the selected unit. This function sends registration information that is used to authorize use of the main Rockhound firmware as well as additional chargeable options for Rockhound. After sending updated registration information, ROCKTalk will instruct Rockhound to restart to utilize the new registration.

Without valid registration codes access to Rockhound functionality is severely limited. Without a valid registration code for the main Rockhound firmware, the Rockhound firmware will start but will display warning messages on startup and will run in demo mode for up to 12 hours and will then terminate. In this demo mode, all Rockhound modules may be used but only for the 12 hour trial period.

If a valid registration code exists for the main Rockhound firmware, then there is obviously no 12 hour limit. However, if additional modules are added to the configuration that are not part of the basic Rockhound firmware package (but are separately authorized chargeable options) then those modules WILL NOT START. Modules requiring separate authorization will be marked as such in the documentation. Check the documentation (this manual) to be sure.

When registration information is supplied by Kinemetrics for Rockhound, it will generally be supplied in the form of a .CFG file that can be transmitted directly to the unit.

NOTE: Registration is not required for Rockhound when used on a Rock digitizer such as a Granite.

Rockhound Firmware Update - Sends a firmware update to a unit.

Rockhound firmware is distributed as a JAR file that is a single file containing a collection of files. This is similar to a ZIP file in many ways. See Definitions for more information on JAR files.

When the Firmware Update menu selection is made, the user will be requested to select the JAR file containing the firmware update to be sent.

After selecting the firmware image, the user will be presented with a list of available units. This allows the user to update one or more units at one time. ROCKTalk will manage the transmission of updated firmware to all selected units.

Once selected, ROCKTalk will connect to the selected units by talking to their CommandConsole(s) and will determine where the firmware is located on the unit. Every Rockhound layout includes a CommandConsole module - See Command Console.

Next, ROCKTalk will transfer the firmware update to the unit using SCP/FTP or file copy as determined by the configuration of each unit within ROCKTalk.

After transfer of the update, ROCKTalk will command the unit to restart. Restarting the unit allows it to extract, install and execute the update. Validation of the new firmware is done automatically by the unit before accepting and installing the new firmware. The validation process can take up to a minute to complete.

Please note that unlike previous Kinemetrics products, the design of Rockhound allows new firmware to be loaded without having to default parameters and reconfigure Rockhound like you would do with an Altus recorder after updating firmware. Kinemetrics recommends however, that the user still review the Rockhound parameters after a firmware update.

Edit Hardware Config - Edits the hardware configuration parameters of the selected unit. These are the parameters that are unique to a particular unit such as the Rockhound name, serial number, sensor information, etc.
Edit Parameters - Edits the Rockhound parameters of the selected unit. These parameters are not unique to a particular unit, and these parameters should be useable by a group of units that are set up similarly.
Replace Module - Replace a module with another compatible module type.
Advanced Features - Access to advanced ROCKTalk features.

HELP

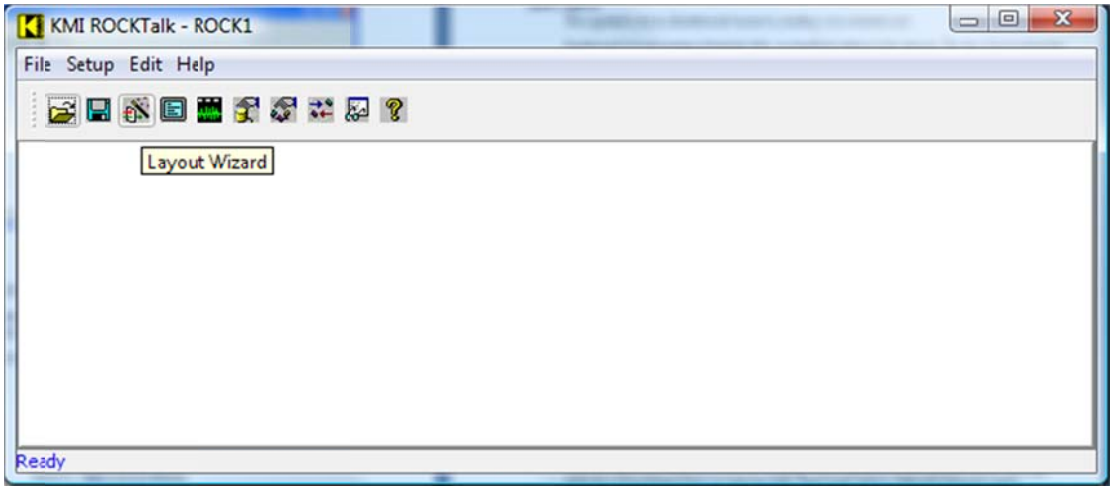
About - ROCKTalk version and copyright information.

Tool Bar

The tool bar provides fast access to ROCKTalk functions without having to navigate through a menu. Most functions available on the tool bar are also available on the menu though, so for most activities, use of the menu or use of the tool bar is a matter of personal preference.

This section describes ROCKTalk functions in detail, with only a few functions that are not available through the tool bar described in the Menu section.

Notice that tool bar and dialog buttons contain tool tips. So if the cursor is placed over a button or other display widget and held there for about two seconds, a tool tip that briefly describes the function of the display element will appear:



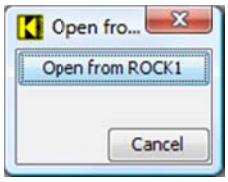
ROCKTalk Tool Tips

Open Layout

This operation opens a Rockhound layout by reading it from a selected unit.

Rockhound layouts consist of multiple files, as described earlier in this manual. The Open Layout function reads all of these files into ROCKTalk so that they may be reviewed, changed, or saved.

When Open Layout is selected, the user is presented with a selection dialog as follows:



Open Layout Dialog

Reads the layout from the currently selected unit. This is done by ROCKTalk automatically performing the following steps:

- Connect to the selected unit's CommandConsole to determine where the layout is located on the unit. (See CommandConsole)
- Transfer the layout using SCP/FTP or file copy as selected for this unit.
- Place the retrieved layout into the layout configuration directory and expand it into the various files that comprise the layout.

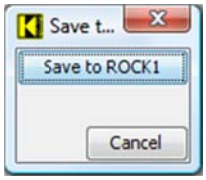
If the layout validates, ROCKTalk will display the validation message.

Save Layout

This operation saves a Rockhound layout by sending it to a selected unit.

Rockhound layouts consist of multiple files, as described earlier in this manual. The Save Layout function writes all of these files from ROCKTalk so that they may be stored for future use or transmitted to a unit for immediate use.

When Save Layout is selected, the user is presented with a selection dialog as follows:



Save Layout Dialog

Send to unit - Sends the layout to the currently selected unit. This is done by ROCKTalk automatically performing the following steps:

- Write the current layout/configuration that ROCKTalk has open into a temporary JAR file called "config.jar".
- Connect to the selected unit CommandConsole to determine where the layout is located on the unit.
- Transfer the layout using SCP/FTP or file copy as selected for this unit.
- Instruct the unit (via the CommandConsole) to terminate the current Rockhound layout and JVM and restart so that the new layout and/or configuration activates.

Layout Wizard

The Layout Wizard makes it easy to create Rockhound layouts from predefined layout templates.

For example, to create a simple continuous recorder layout, select the number of channels being used, select the data source (such as an RS-232 interfaced Altus digitizer or an IP interfaced Q330), and then select the output format of how to store the data. That's pretty much it. Edit the parameters before transmitting the new layout to the unit to set/change parameters from their default values or to specify some of the values that cannot be meaningfully defaulted. For example, you may need to set IP addresses, baud rates, sample rates, or other parameters.

The Layout Wizard can also handle more complex configurations, such as:

Rockhound configurations with multiple data sources (multiple Q330s, multiple Altus digitizers, or some combination of dissimilar datasources).

Event recorders with one or more data sources that trigger filter the data, trigger on it, and then event record it in a specified format.

Combined Event recording and Continuous recording systems that both store data continuously and do event recording, perhaps in different formats, and on different drives.

Combined recording and telemetry systems that take data in from a data source, do event or continuous recording, and then forward the data through a selected telemetry link using a specific protocol.

One nice thing about the Layout Wizard is that the complexity of the creation process scales with the complexity of the application. In other words, to create a simple layout it is only necessary to specify a few items; to create a complicated layout more choices must be made because there are obviously more choices.

When a layout template calls for the inclusion of a module into the layout, the Layout Wizard will check to see how many compatible modules of that type exist. If there is more than one choice then the user will be requested to select the desired module. If on the other hand there is only one choice, then the module is silently added and the user is not bothered with a question.

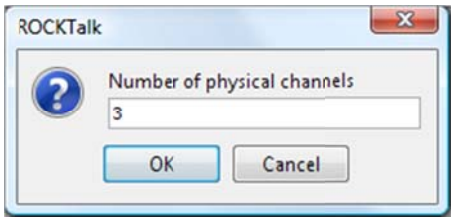
Once all of the modules of the layout have been selected, the final step of the Layout Wizard will be to display a list of predefined options. These are modules (or combinations of modules) that can be added to the completed basic layout to provide additional functionality. Options would include such things as an HTTP Server (web server), auto file delete, timed activities such as timed checkin or timed recording, or notification options such as SMS, Pager, or e-mail.

For example, let's go step by step through the process of creating a Rockhound Layout for a Continuous Recorder that takes 3 channels of data in from a TCP/IP interfaced Altus digitizer, and records the data continuously in MiniSEED format.

To create this layout, the first thing we need to do is to select the Layout Wizard. Once selected, the wizard will present a list of the layout templates that are available in the current firmware. Select the "Simple Continuous Recorder", simple in that it takes data from only one digitizer (as opposed to a "complex" recorder that takes data from multiple recorders:

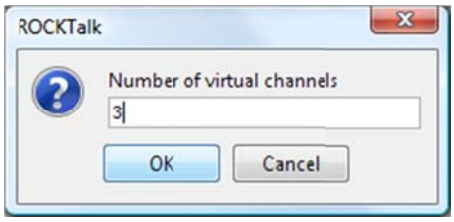
Selecting a layout type

Select the number of physical channels coming from the digitizer:



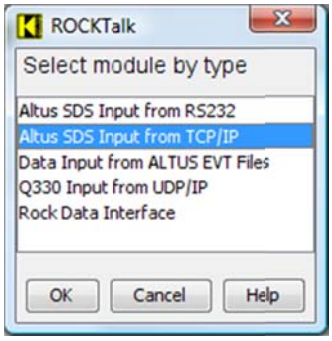
Selecting the number of physical channels

Select the number of virtual channels coming from the digitizer. Virtual channels are the actual channels you want produced - for example, you might have 4 physical channels (1-4), but want data produced for each at two different sample rates for a total of eight virtual channels:



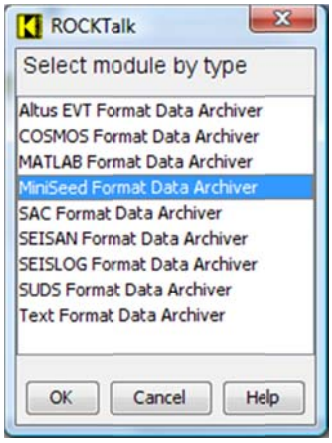
Selecting the number of virtual channels

Select the type of data source:



Selecting the data source

Select the output format:



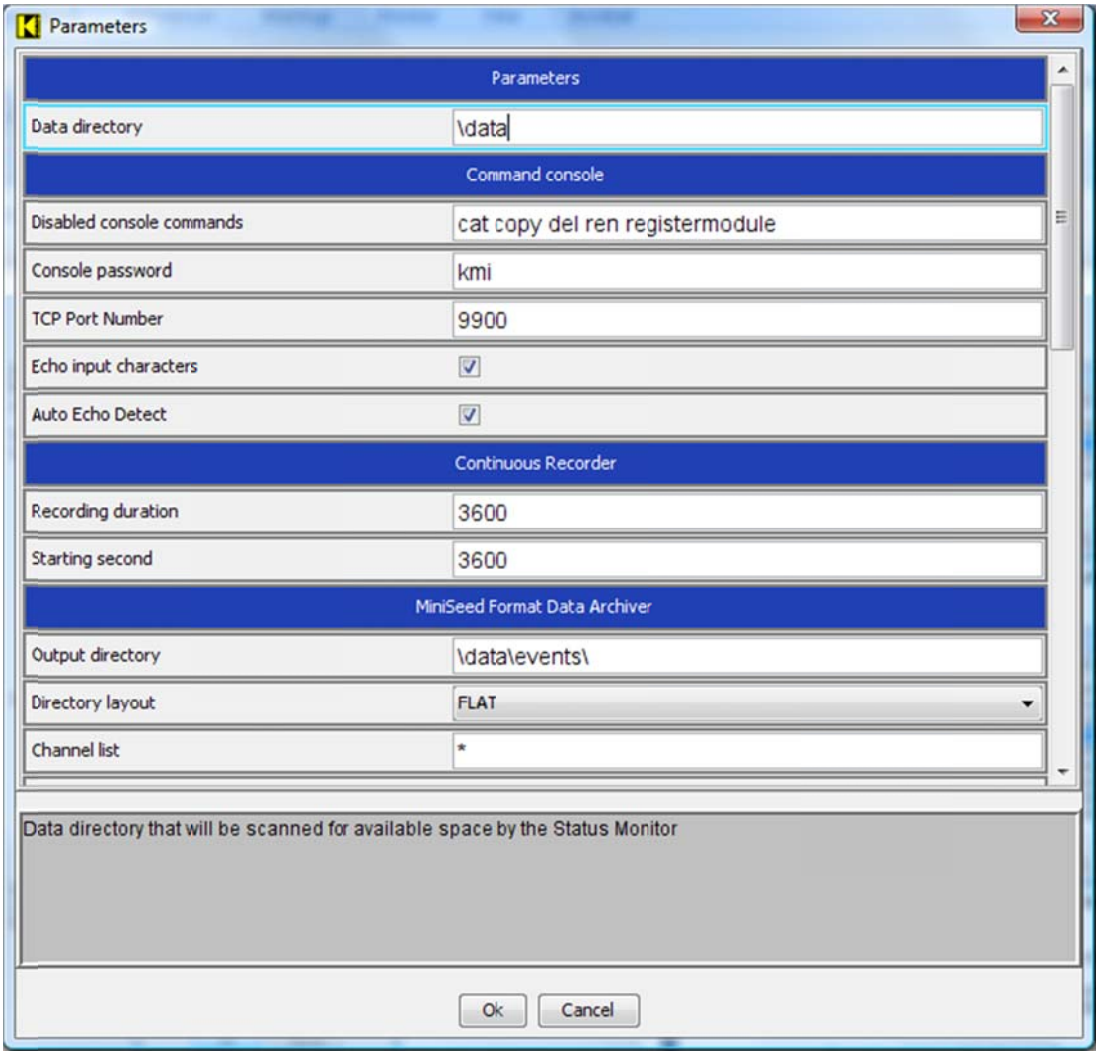
Selecting the output format

The initial layout is now complete.

Using the parameter editor, set the parameters of the new layout appropriately. In this particular example you will have to set the IP address and port used by the "Altus SDS Input thru TCP/IP" and perhaps others.

The meaning of each parameter is described in the help string at the bottom of the edit window. In addition, descriptions are given in the description of each Rockhound module, located later on in this manual.

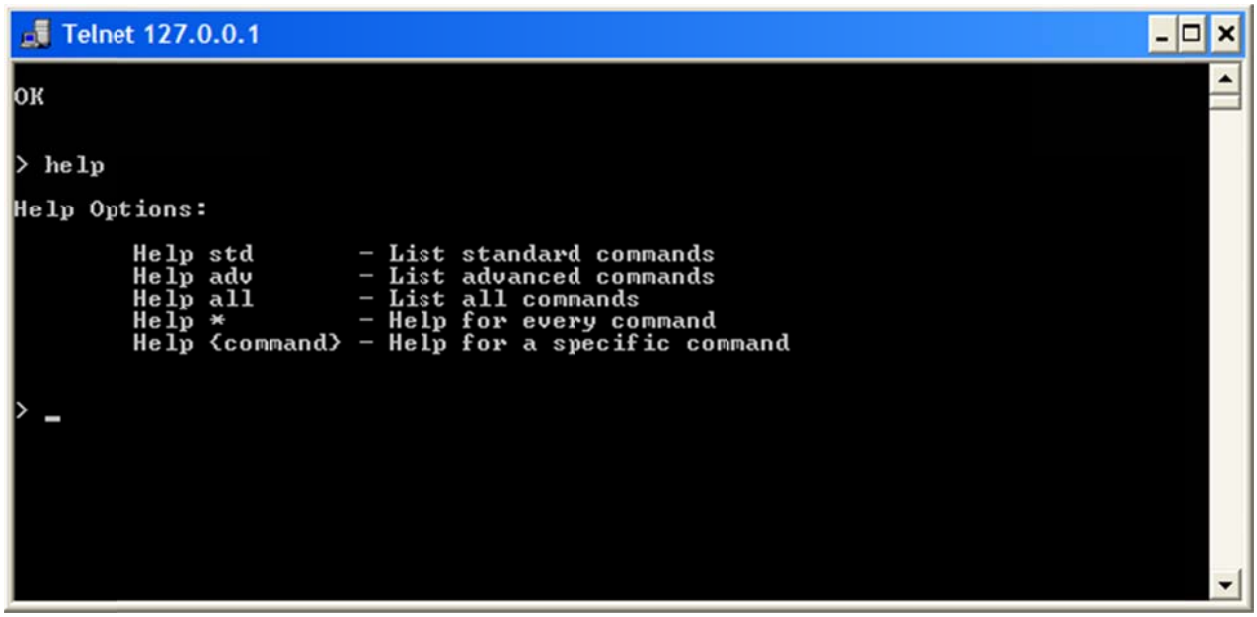
After making all the needed edits to the Rockhound parameters, the parameter list for this configuration should look something like this:



Parameters after setup complete

Terminal Window

The Terminal Window function opens a TELNET session to the CommandConsole of the selected unit using the IP address and command port specified in ROCKTalk Setup. All functions of the CommandConsole are then available through this window and are described in some detail in the description of the CommandConsole.


Telnet 127.0.0.1
OK
> help
Help Options:
Help std - List standard commands
Help adv - List advanced commands
Help all - List all commands
Help * - Help for every command
Help <command> - Help for a specific command
>

Terminal Window

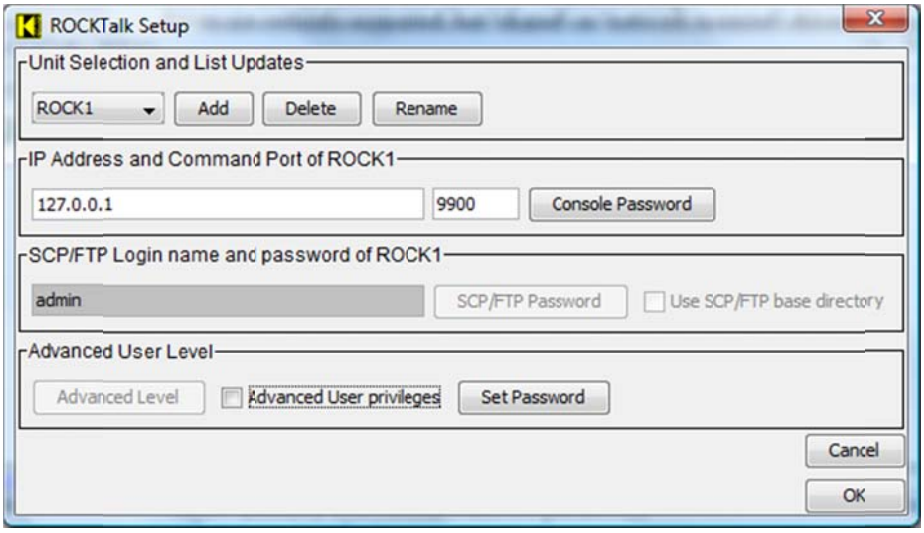
NOTE that the Rockhound CommandConsole only supports one connection at a time, so while connected to a unit through its CommandConsole no other connection will be allowed.

RockTalk Setup

Enters ROCKTalk Setup to allow selection of unit and setup of communications options for each unit.

It also allows selection of the advanced user password. This password is primarily there to restrict inexperienced users from some of the more complex functions. No advanced user password is set by default. If a password is needed, select Set Password and specify one.

The ROCKTalk Setup dialog appears as follows:



ROCKTalk Setup Dialog

The various components of the ROCKTalk Setup dialog are as follows:

unit Selection and List Updates - Provides the means to manage a list of known unit.

A pull down list ("ROCK1" in this example) allows selection between several previously defined unit. ROCKTalk will remember communications options for each unit, saving the user the trouble of re-entering these each time a new unit is selected.

ADD allows the user to define a new unit and add it to the list. The first question that will be asked is the name of the new unit. This name must be unique.

DELETE allows deletion of a unit from the list of known unit. To delete a unit from the list, select it from the pull down list and select DELETE.

RENAME allows renaming of an existing unit. To rename a unit, select it from the pull down list and select RENAME.

IP Address and Command Port of unit - ROCKTalk uses TCP/IP to communicate with a unit. Use of TCP/IP requires an IP address and a CommandConsole IP Port number. The most important part of TCP/IP communication with the unit is the ability to connect to the CommandConsole of the unit. These parameters allow specification of the unit IP address and command port. (See CommandConsole)

IP ADDRESS (127.0.0.1 in this example) specifies the IP address of the selected unit. Each unit will be assigned a unique IP address by whoever sets up your network, just as each computer on a LAN is assigned a unique IP address. In this example, 127.0.0.1 is used, an IP addressing convention that indicates that the selected unit is running on the same computer as ROCKTalk.

CONTROL PORT (9900 in this example) specifies the CommandConsole port for the unit. 9900 is the default for the CommandConsole module.

CONSOLE PASSWORD must be set to the same value as the unit command console password parameter. Unless changed here and in the unit layout, both the unit and ROCKTalk will use the same default password. See the detailed description of the CommandConsole module.

NOTE: All Rockhound layouts must include a CommandConsole.

SCP/FTP Login name and password of unit - If file communication between ROCKTalk and the unit will be done via SCP/FTP, then an SCP/FTP login name and SCP/FTP password must be specified. If file copy will be used instead of SCP/FTP (as in this example), then the SCP/FTP login name and SCP/FTP password will be disabled.

LOGIN NAME Specifies the login name used for SCP/FTP login.

SCP/FTP PASSWORD specifies the SCP/FTP password expected by the unit.

File Path to unit - If file communication between ROCKTalk and the unit will be done via file copies, then a file path to the unit must be specified. The path can be specified by typing it in directly, or by using the Browse Path button to navigate to the unit directory.

If this method is used, the File Path must be directly accessible from the ROCKTalk computer. In other words, it should be possible to use the copy and directory functions of the operating system to access the directory and the files in that directory without needing to use SCP/FTP or other such methods. Local hard drives are certainly supported, but "shared" or "network mounted" drives can also be used in this way.

The selected directory should be the one that contains the subdirectories **bin, classes, config, injar, lib** and **outjar.**

FTP used for file transfers - This is where the choice is made to use FTP or file copies for file communication between ROCKTalk and this unit. The option is set independently for each unit.

SCP used for file transfers - This is where the choice is made to use SCP or file copies for file communication between ROCKTalk and this unit. The option is set independently for each unit.

Advanced User Level - Allows specification of advanced user capabilities. These advanced capabilities only affect those users that have requested advanced user status. These capabilities include:

- Allow archiving/dearchiving of configurations
- Allow choice of SCP/FTP or COPY for config access
- Allow access to advanced modules
- Allow access to advanced parameters
- Allow layout save to or from a file
- Allow access to Level of Debug control
- Allow access to Module Rename function
- Allow access to Test Modules and test parameters
- Allow access to plugin management
- Allow access to Subscription Edit function
- View layout each time it is validated, even if OK

Advanced User privileges - Allows selection of advanced user status. By default, the user is not given advanced user status and has no special privileges. If an advanced user password has been set, then the user must provide the advanced user password before advanced user privileges can be turned on. No advanced user password is needed to turn off advanced user status.

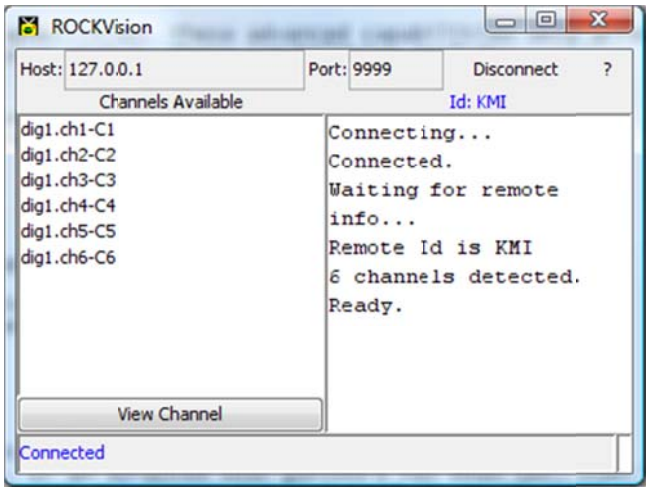
Set Password - Allows setting or changing the advanced user password. To change the advanced user password, you must know the previous advanced user password.

Cancel - Exits ROCKTalk Setup discarding any changes to Advanced Privileges. Unsaved changes to Rockhound communications options are also discarded.

OK - Exits ROCKTalk Setup saving any changes that have been made.

Waveform Viewer Window

The Waveform Viewer Window button is used to display waveforms of the data flowing through Rockhound. Pressing the Waveform Viewer Window button will cause ROCKTalk to show a list of available channels on the unit. One or more of the waveforms representing these channels may be displayed by selecting from the list. Each waveform will be displayed in a separate window.



Waveform Viewer Selection display

The components of the Waveform Viewer Selection display, or "ROCK Vision" are as follows:

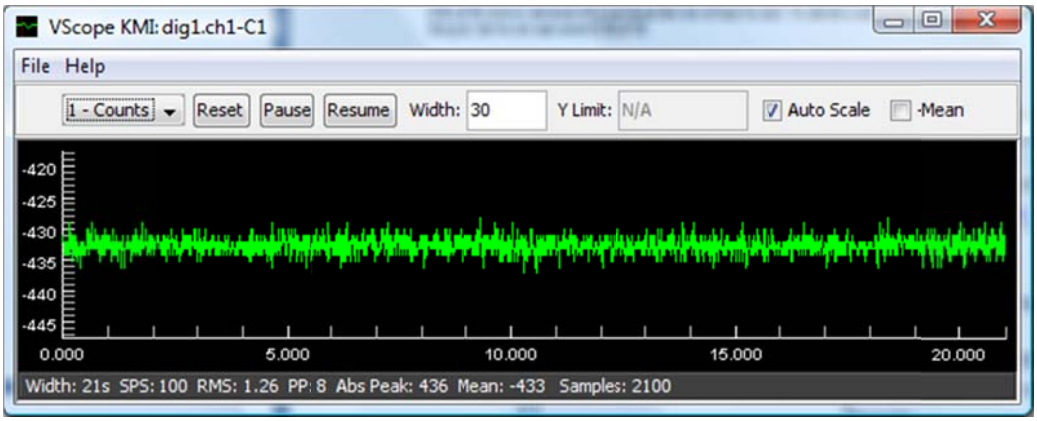
```
Host - The IP address of the unit
Port - The Telemetry Connection port of the unit
Disconnect - Press to disconnect, press again to reconnect to this unit or another unit
? - Help on this version of Rock Vision
Channels Available - Channels reported by the unit as available for telemetry
Rockhound Id - Rockhound ID string
Message box - Telemetry related status messages
View Channel - Press to display waveform windows of selected channels
Connected - Rock Vision status
```

Notes:
- The Rock Vision window may be resized
- Closing the Rock Vision window closes all waveform windows created by it.

The viewer is intended as a quick check of the overall condition of the unit, and not as a data collection or data processing facility. However, within those restrictions, it can give a good general feel for the condition of the unit.

The Waveform Viewer requires a corresponding Telemetry Connection object to be included in the Rockhound layout. If none is present, then the Waveform Viewer dialog will start, but will indicate a port number of zero.

The Waveform Viewer appears as follows:

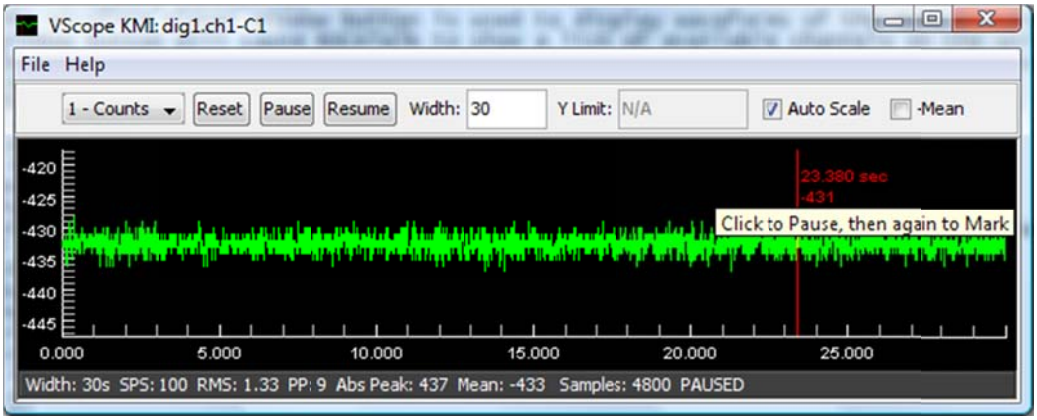


Waveform Viewer display

The functions across the tool bar portion of the Waveform Viewer window are as follows:

```
UNITS - Short here in counts. Includes counts, Volts, G, gal, cm/s^2, and custom units.
RESET - Clears the display and sample counter.
PAUSE - Pauses the display, but does not affect data flowing through Rockhound.
RESUME - Resumes display of data after a pause.
WIDTH – Width of the window in seconds.
Y LIMIT – Sets the Y axis display limit if not auto-scaled.
AUTOSCALE - Autoscales the data to fit the display.
MEAN - Removes the mean from the displayed data.
```

The Waveform Viewer may be paused by clicking in the data portion of the display. Doing this pauses the display and shows instantaneous values such as the sample number, amplitude of the marked sample, instantaneous frequency, and segment absolute peak-to-peak value. Click RESUME to continue the display.



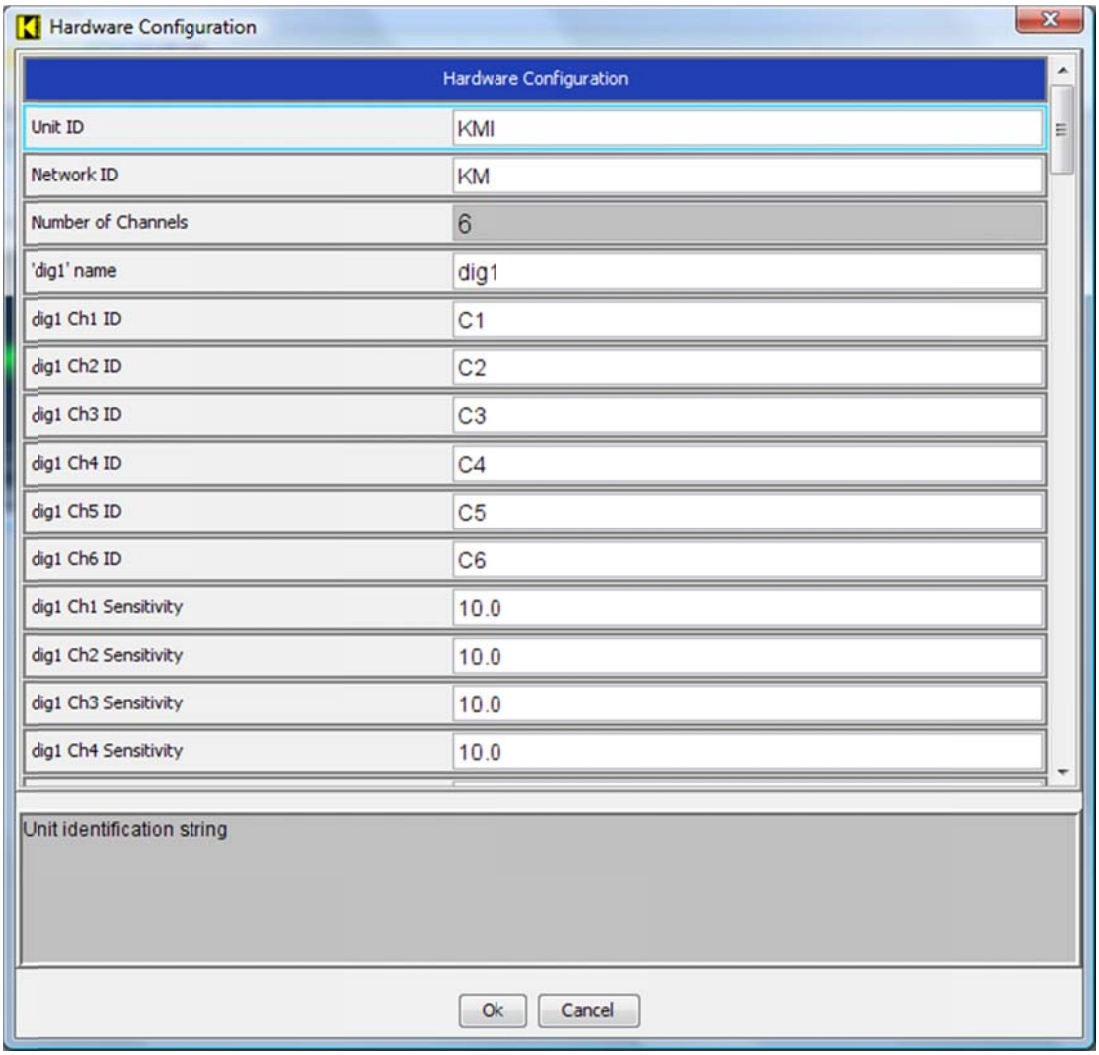
Waveform Viewer clicked to pause

Edit Hardware Configuration

The Rockhound configuration data is logically divided into two sections: That which is hardware specific, and that which is not.

This function allows editing of those parameters that are hardware specific. Possible hardware specific parameters could include individual unit serial numbers or sensor information.

Upon selecting Edit Hardware Configuration, a standardized edit dialog will appear that will contain as many hardware related parameters as are appropriate to the current configuration.



Hardware Edit Dialog

Note the brief description of each parameter to the left of the value, that some values are read-only (like maximum number of channels), and also note the extended description for the current parameter at the bottom of the dialog.

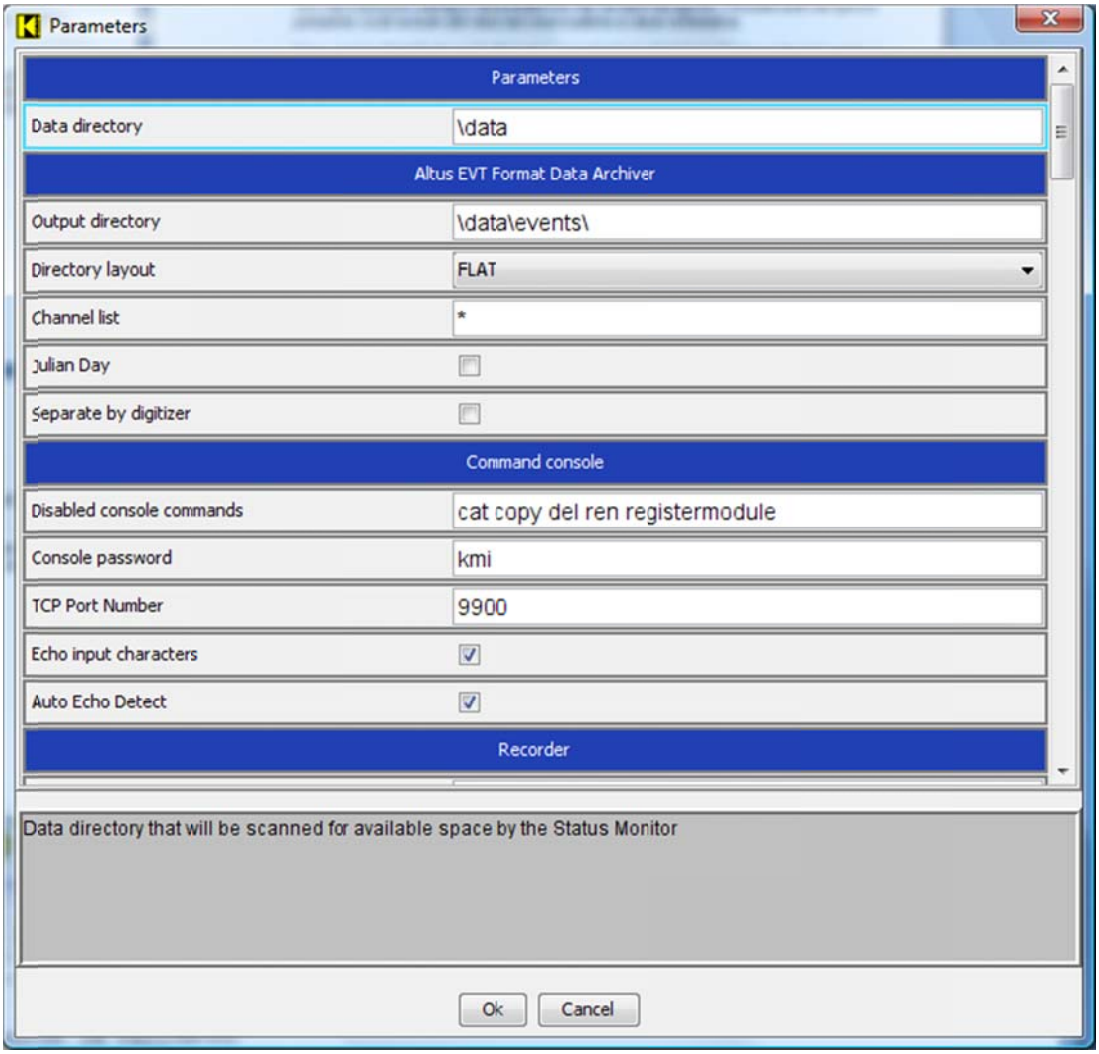
On exit from the dialog, parameters are range checked to make sure that they are of the proper type and are within their defined limits.

This example is from the Continuous Recording example built in the Layout Wizard section.

Edit Parameters

The Rockhound configuration data is logically divided into two sections: That which is hardware specific, and that which is not.

This function allows editing of those parameters that are NOT hardware specific. Upon selecting Edit Parameters, a standardized edit dialog will appear that will contain as many parameters as are appropriate to the current configuration.



Parameter Edit Dialog

Note the brief description of each parameter to the left of the value, the fact that some values are read-only, and also note the extended description for the current parameter at the bottom of the dialog. Also note the scroll bar to the right of the dialog because it is very likely that there will be more parameters in the configuration than can fit on one screen.

On exit from the dialog, parameters are range checked to make sure that parameters entered are of the proper type and are within the limits declared for each parameter.

This example is from the Continuous Recording example built in the Layout Wizard section.

Archive Layout

This function allows the current Rockhound layout and configuration to be stored as a single JAR file. This allows the layout to be stored for future use as a single file. (Special advanced level only)

When the function is selected, a file selection dialog will be presented that is used to select the name and location of a JAR file to hold the present configuration.

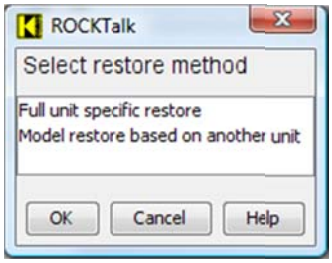
NOTE that registration information is not affected by Archive and De-Archive functions.

Naming is left totally up to the user, so a name should be selected that indicates what unit this information is from, and perhaps additional information about what type of layout is contained in it.

De-Archive Layout

This function allows opening of an archive JAR file so that a configuration may be restored to a unit or used as a basis for configuration of another unit. (Special advanced level only)

When the function is selected, a file selection dialog will be presented that is used to select the name and location of a JAR file to be opened and de-archived.



De-Archive type selection

After selecting the file, the user must select between two de-archive options:

Full unit specific restore - Restores all aspects of the layout and configuration, including hardware and non-hardware specific components.

Model restore based on another unit - Restores only those parts of the layout configuration that are not hardware specific - that is to say everything except hardware.cfg. This allows the information to be used as the basis for the layout and configuration of another similar unit.

NOTE that in either case, registration information is not affected by Archive and De-Archive functions.

Replace Module

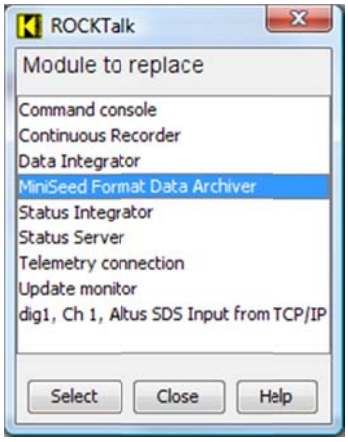
This function allows replacement of Rockhound modules with another compatible module.

Using the replacement function, modules can be replaced after the layout has been initially created. A trigger can be replaced with a different type of trigger, trigger filters replaced with different types of trigger filters, input data sources changed, output formats changed, and so on.

In each case, the user's choices are limited to compatible modules during a replacement.

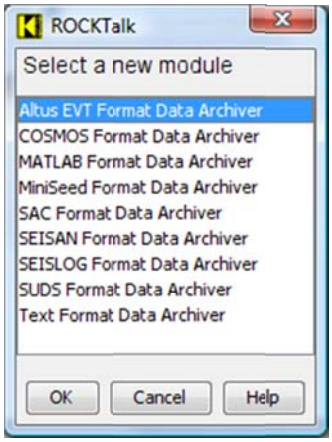
Using the Continuous Recorder example created in the Layout Wizard section, let's replace the MiniSEED Archiver module with an Altus EVT Archiver.

To do this, select Replace Module, and then select the module to be replaced:



Selecting module to be replaced

Then select the new module that is being substituted:

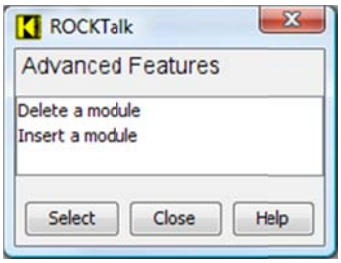


Selecting the replacement module

After making the replacement, be sure to review the parameters to make sure that any parameters of the new module are set properly before sending the revised configuration to the unit.

Advanced Features

The Advanced Features function allows more detailed operations which are more difficult concepts and which should not be attempted by other than advanced users. The advanced features selection appears as follows:

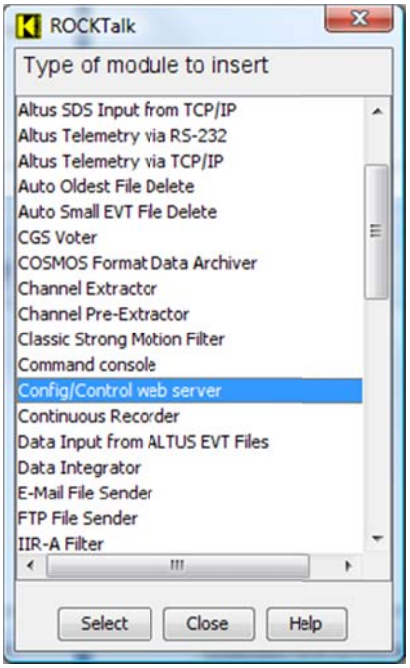


Advanced Features selection

Insert a module - Provides a method to insert modules into the layout. As with deleting modules, this can quickly become complicated. For example, in many cases modules publish data that is subscribed to by other modules.

If you insert module C into the data stream between modules A and B you may need to edit the subscriptions such that module B now subscribes to the output of the new module C and the new module C now subscribes to the output of module A. It gets complicated fast.

For the purposes of this example, we'll insert a module that has no subscribers - We'll insert a Web Server:

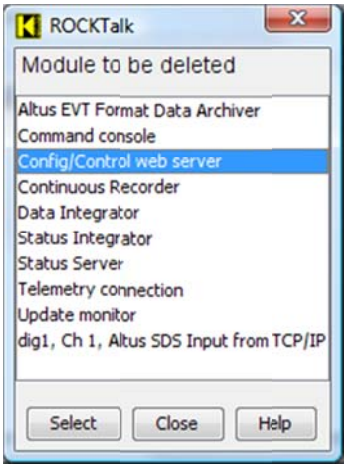


Inserting a module

Delete a module - Provides a method to delete modules out of the layout. Although this seems simple enough, it can become complicated if the module being deleted publishes data which is then in turn subscribed to by other modules.

If you delete module B of a data stream consisting of modules A, B, and C you may need to first change module C so that it now subscribes to module A and then delete module B. Again, it gets complicated fast.

For the purposes of this example, we'll delete a module that has no subscribers - The Web Server:

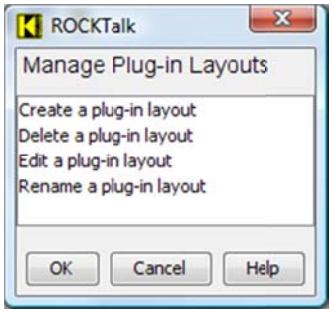


Deleting a module

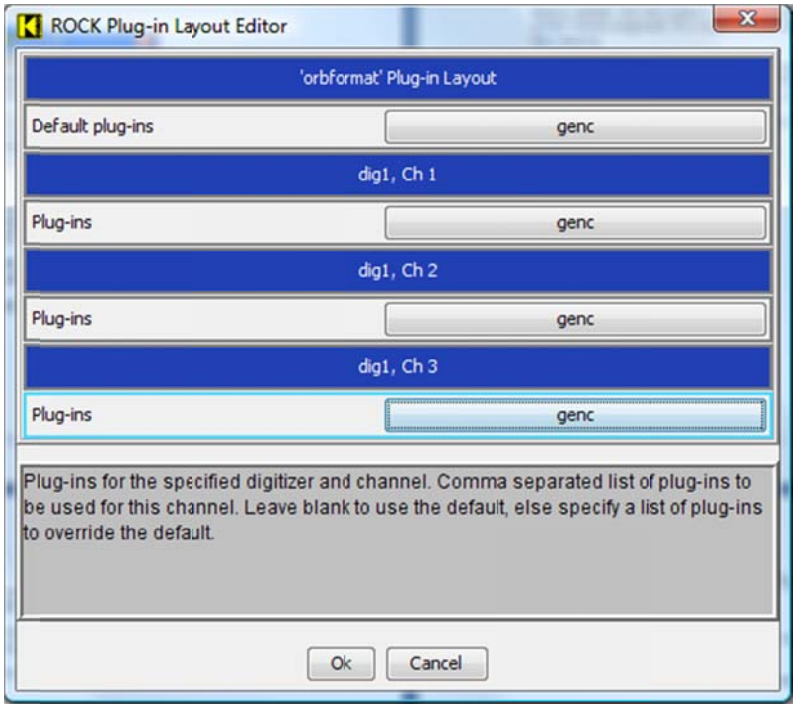
Level of debug - Provides a method to set the debug levels of each module. Debug levels are primarily intended for use by Kinemetrics personnel and should only be used by the customer under specific direction from Kinemetrics personnel. (Special advanced level only)

Debug levels and their meanings are subject to change at any time.

Manage plug-in layouts - Provides a set of functions for handling plug-in layouts. These functions allow you to create, edit, delete and rename plug-in layouts. Once plug-in layouts are created, they may be edited to specify activities to be performed on the data for each channel (the actual plug-ins). The created plug-in layouts are available for selection from Rockhound modules that support plug-ins. (Special advanced level only)



Manage plug-in layouts functions



Newly created plug-in layout description

Rename a module - Provides a method to rename modules. This should only be necessary under very special test conditions.

Module renaming is primarily intended for use by Kinemetrics personnel and should only be used by the customer under specific direction from Kinemetrics personnel. (Special advanced level only)

Subscription edit - Provides a method for editing module subscriptions. Again this is something that rarely, if ever, should need to be done by the customer.

Editing subscriptions alters the data flow in the system and could leave some modules as "orphans" that no longer receive data.

Although subscription editing is not substantially restricted beyond requiring Advanced User status, it is primarily intended for use by Kinemetrics personnel and should only be used by the customer under specific direction from Kinemetrics personnel. (Special advanced level only)

Help About

Displays version and copyright information about the current copy of ROCKTalk.

3. How Do I...

This chapter addresses commonly asked questions about the configuration and operation of the Rockhound firmware and/or the ROCKTalk software.

The main goal here is to deal with common questions and operational issues.

Add a unit to ROCKTalk

To add a unit to ROCKTalk so that it is remembered in the list of available units, select the Open Layout or Save Layout function, and then go to ROCKTalk Setup.

Once in ROCKTalk Setup, click the Add button at the top of the dialog and enter the name of the new unit when asked. The name is only for display purposes within ROCKTalk and can be any reasonable length. Press OK after entering the name.

Enter additional information needed to communicate with the unit including its IP address and file transfer method (SCP/FTP or file copies) and any other needed details.

If communication with the unit will be via SCP/FTP, then specify:

- IP address of unit
- Command port of unit (default is 9900)
- Select the checkbox for "FTP used for file transfers" or "SCP used for file transfers"
- SCP/FTP login name
- SCP/FTP password
- Press ROCKTalk Setup's OK button to save the changes

If communication with the unit will be using file transfers, then specify:

- IP address of unit
- Command port of unit (default if 9900)
- Uncheck the checkboxes for "FTP used for file transfers" and "SCP used for file transfers"
- File path to the unit SMARTSDist directory
- Press ROCKTalk Setup's OK button to save the changes

Select a unit

To select which instrument ROCKTalk communicates with, select the Open Layout or Save Layout function, and then go to ROCKTalk Setup.

Once in ROCKTalk Setup, pull down on the list of units at the upper left hand corner of the dialog and select a unit. If the unit needed is not yet in the list, follow the directions as described in "Add a unit". Press OK after entering the name.

After exiting ROCKTalk Setup, the name of the unit will be displayed on the title bar of the ROCKTalk window.

Make a New Configuration

To discard the current configuration of the unit and create a new layout and configuration, make sure to select the unit to be affected first.

Next, select the Layout Wizard from the menu or the tool bar. The Layout Wizard is described in another section of this manual.

After using the Layout Wizard to create the layout, edit the unit parameters to set up the parameters in detail as required. To do this, select Edit Parameters from the menu or tool bar and set the parameters as needed.

Once the Layout has been created and the parameters properly adjusted to meet the requirements, send the updated configuration to the unit by selecting Save Layout from the menu or tool bar and then press Send to unit.

The layout can also be saved to a file or the layout can be archived for future use.

Edit Rockhound Parameters

To edit parameters of an existing Rockhound configuration, select the unit to be affected first.

Next, load the configuration from the unit (or from a file) by selecting Open Layout from the menu or tool bar and then selecting From a File or From a unit as appropriate.

Once the configuration is loaded into ROCKTalk, select Edit Parameters from the menu or tool bar and edit the parameters as needed.

To change modules - for example to change an event recorder to use STA/LTA triggering instead of threshold triggering, or to use an IIR trigger filter rather than a Classic Strong Motion trigger filter, use the Replace Module function rather than the Edit Parameters function. Edit Parameters is intended for altering parameters within currently included modules. After changing the layout by replacing, inserting, or deleting modules it is a good idea to review the parameters using Edit Parameters.

After editing the parameters, select Save Layout from the menu or toolbar and then choose Send to unit or Save to File as needed.

Archive a Rockhound Layout

After creating a new layout or making significant changes to Rockhound parameters, it is a good idea to archive a copy of the parameters for future reference or backup.

With the layout currently loaded into ROCKTalk, select Archive Layout from the menu or tool bar. Specify the location and name of the JAR file into which the layout will be saved. Be sure to use a filename that will be meaningful in identifying the unit and/or type of layout.

De-archive a Rockhound Layout

To restore a previously archived Rockhound layout, make sure to select the unit to be affected first if the layout will be sent to a unit after de-archiving it.

Select De-Archive Layout from the menu or tool bar. Specify the name of the JAR file that is being de-archived using the file selection dialog.

After giving the filename, choose whether to do a "Full Unit Specific Restore", which extracts all of the layout including those items that are specific to an individual unit (hardware.cfg), or select "Model Restore Based on Another Unit", which extracts everything except the parameters unique to an individual unit (everything except hardware.cfg). This second method allows using a layout for multiple units where similar setup is desired.

After extracting the layout, review and/or correct the parameters using Edit Parameters and finally send the parameters to the unit by selecting Save Layout and then Send to unit.

Open a Terminal Window

To open a terminal window to the unit, make sure to select the unit to be affected first.

Next, select the Terminal Window function from the menu or tool bar. This function will open a TELNET session (a terminal window) using the IP address and command port as listed for the unit on the ROCKTalk Setup dialog.

Update Rockhound Firmware

To update Rockhound Firmware, first locate the firmware update file. This will be a JAR file and will be named in the form UpdateXXXX.jar. Make sure to select the unit to be updated first.

Select Rockhound Firmware Update from the menu and select the update file. The file will be sent to the unit using the connection specified in ROCKTalk Setup for that unit and then Rockhound will be commanded to restart.

When Rockhound restarts, it will see the update firmware file and will unpack it and install it, and then will restart again to make use of the new firmware.

After updating firmware be sure to review the unit parameters.

Access the Linux Console

To access the Linux console on a Linux based system, connect an RS-232 connection to the RS-232 console port (/dev/console). This port is enabled at 9600 baud, 8-N-1.

In some cases, it may be necessary to initially log into Linux via the console before the network has been configured, and before access via Telnet is possible.

Manage Plug-in Files

The files that contain attributes of plug-ins, including those used for data filtering, are contained in what are called Plug-in Files. These files have a ".plg" extension. Some plug-in files are supplied by Kinemetrics with the Rockhound Distribution, and will be automatically placed in the config/plugins directory when the Rockhound distribution is installed either on the unit itself, or in the config/pluginarchive directory on the PC used to run ROCKTalk.

When a configuration is sent to a unit, the contents of the config/pluginarchive directory will be included in the config.jar file that is sent to the unit. These files will be unpacked into the config/plugins directory on the unit. The user may define his own plug-in files subject to the definition of the structure of plug-in files, and may include these files in the config/pluginarchive directory on the PC used to run ROCKTalk. These additional files will be sent to the unit when configuration information is sent, and these user defined files will not be overwritten on the PC by a Rockhound software update or other configuration change.

Please note that the plug-in files stored on the PC will be included in the configuration information for every unit that is accessed and controlled by ROCKTalk on that PC.

The details of the contents of a Plug-in File are dependent on the type of plug-in, and will be described in the detailed description of the plug-in, which includes plug-in filters.

Manage Plug-in Layout Files

Plug-in layout files define data processing activities to be performed for a particular unit. Plug-in layouts must be created for each unit, and each plug-in layout's data must be edited to specify the data processing activities (the actual plug-ins used) for each channel of the plug-in layout.

Plug-in layout files are located in config/pluginlo, and are included in any configuration data uploaded or downloaded from each unit.

4. Software Installation

This chapter addresses installation of ROCKTalk software, as well as use of the Rockhound firmware on a customer supplied computer.

Descriptions are given of the installation process, which varies from the highly automated methods that Kinemetrics expects to be most commonly used, through less commonly used applications requiring more manual intervention during or after installation.

Overview

Rockhound firmware and support software are written in Java. As one result of this, the distribution has been reduced to a single CD. This CD can be can be used to install Rockhound support software on multiple platforms, such as Windows operating systems, Sun workstations, Linux, and more.

Kinemetrics will include in the installation only those platforms that have been tested, even if it is possible that the software might work on another platform.

The following are included on the CD:

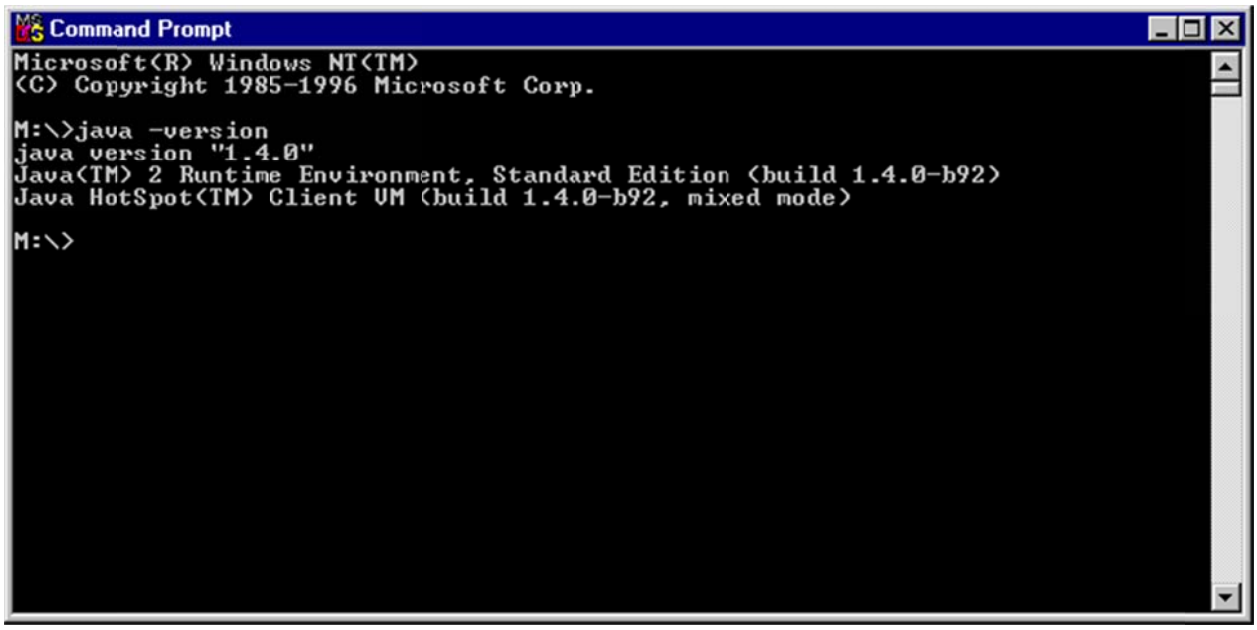
- Rockhound firmware, as an UPDATExx.JAR file.
- ROCKTalk support software.
- Installation routines for supported platforms.
- JVMs for supported platforms.
- Support libraries for supported platforms.
- This manual as a PDF file.

This section describes the process of installing the Rockhound software from CD. The installation process uses Zero G's InstallAnywhere software, which is a multi-platform installer. So although the installation examples you'll see here are for a Windows computer, they are essentially the same as what you'd see on a Linux machine or Sun workstation.

Installing the JVM

In order to run Rockhound or ROCKTalk software on your computer, you must have a JVM installed. If you know for sure that you have a compatible JVM installed on your system, you can skip to the step "Additional Installation Notes". This section will tell you how to determine if you are using the correct version of the JVM and if not, how to install the correct version.

On Windows, Linux, and Unix the fastest way to find out what version of the JVM you have installed is to open a command window and type `"java -version"` as follows:


Command Prompt
Microsoft(R) Windows NT(TM)
(C) Copyright 1985-1996 Microsoft Corp.
M:\>java -version
java version "1.4.0"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.0-b92)
Java HotSpot(TM) Client VM (build 1.4.0-b92, mixed mode)
M:\>

Checking the Java version

The version should be version 1.4.0 or higher. If it is not then follow the instructions on how to install the new version.

It may be necessary to use a command such as `"/usr/java/jre1.4.0_01/bin java -version"` on Linux or Solaris if the java directories have not been added to the path.

For Windows:

To install the JVM for windows, locate and run the file `j2re-1_4_0_01-windows-i586-i.exe` that will be included on the Kinemetrics Rockhound CD.

Follow the installation instructions and install the JVM. Recheck the Java version.

For Linux:

Locate the file `j2re-1_4_0_01-linux-i586.bin` that will be included on the Kinemetrics Rockhound CD. This is the Linux JVM installation. Place the file in a directory `/usr/java` that you may have to create. Make the file executable and run it, by using the following command from the directory in which it is now located:

```
./j2re-1_4_0_01-linux-i586.bin
```

The script will display a binary license agreement, which you will be asked to agree to before installation can proceed. Once you have agreed to the license, the install script will install the JVM in a directory named jdk1.4.0_01 in the current directory.

For Solaris:

Locate the file `j2re-1_4_0_01-solaris-sparc.sh` that will be included on the Kinemetrics Rockhound CD. This is the Linux JVM installation. Place the file in a directory `/usr/java` that you may have to create. Make the file executable and run it, by using the following command from the directory in which it is now located:

```
./j2re-1_4_0_01-solaris-sparc.sh
```

The script will display a binary license agreement, which you will be asked to agree to before installation can proceed. Once you have agreed to the license, the install script will install the JVM in a directory named jdk1.4.0_01 in the current directory.

Create a "jar" file in the `/usr/java/jre1.4.0_01/bin` directory (or equivalent). It should be executable for all users and contain the following one line:

```
java sun.tools.jar.Main $*
```

Reboot or log out and recheck the Java version.

Installing for Solaris

Installation on a Sun workstation is mostly the same as described for Linux or Windows, but the CD format common to many Solaris systems is somewhat incompatible with the formats created by the tools used by Kinemetrics.

It is recommended that you transfer these files to your workstation via FTP or another similar method, and then directly execute the `install.bin` file located in the subdirectory `InstData/Unix/Solaris.`

Be sure that you have appropriate permissions to install the software.

Once you are able to begin the installation, skip to the step "Installation Steps".

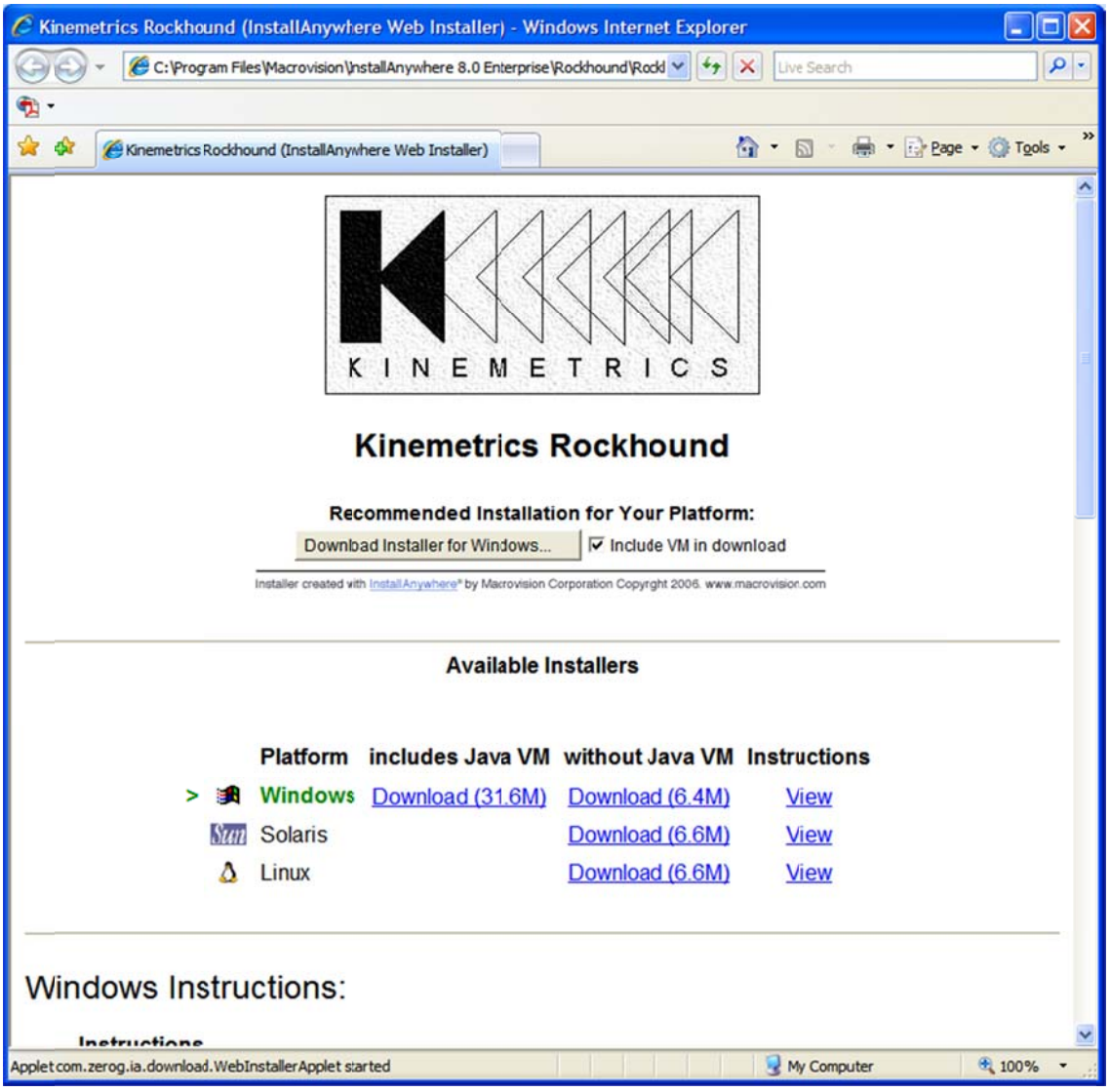
Installing for Windows or Linux

After inserting the CD, locate the file INSTALL.HTM - this is the file that is the starting point for the InstallAnywhere installer. Open this file with your browser, which on most Windows machines is done by simply double-clicking on the file icon. On Linux you single-click.

NOTE: On some systems it may be necessary to download the install to your hard drive, and follow the simple installation instructions given on the INSTALL.HTM screen. You may see a security notice warning you that the installer is about to install some software on your system temporarily. The installer is not connecting to the internet, it does not pose a security risk.

On Linux, be sure that you have appropriate permissions to install the software.

The next screen you'll see is the first actual install screen:



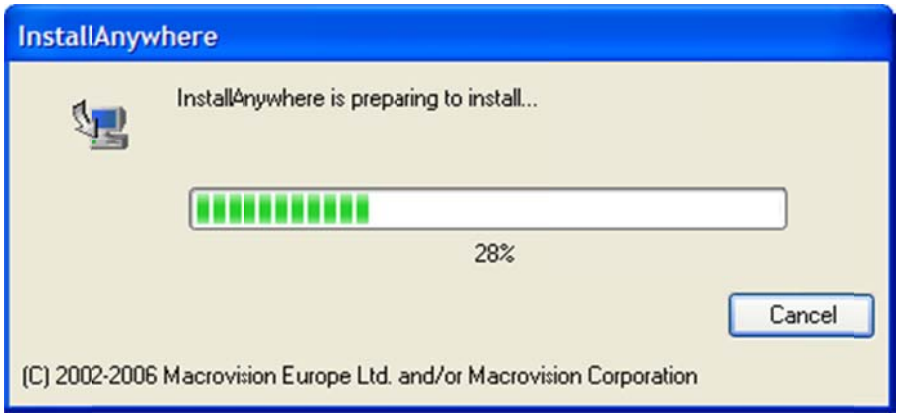
INSTALL.HTM file open in the browser.

Note that in this example the screen includes a one click button (in this case, "Start Installer for Windows") to start the installer for your particular platform. This shows the platform that the installer detected. The other available installers for other platforms are listed below. (If your display doesn't show the one click button, then select from that list of available installers below.)

"Download" is little misleading, as the download is really from the CD to your hard drive.

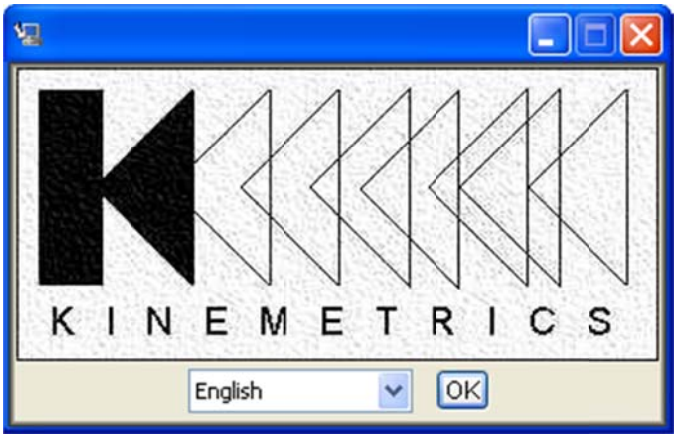
Installation Steps

Once the installation gets started in detail, you may see a screen such as the following to indicate that the installer is unpacking the software and getting it ready for installation:



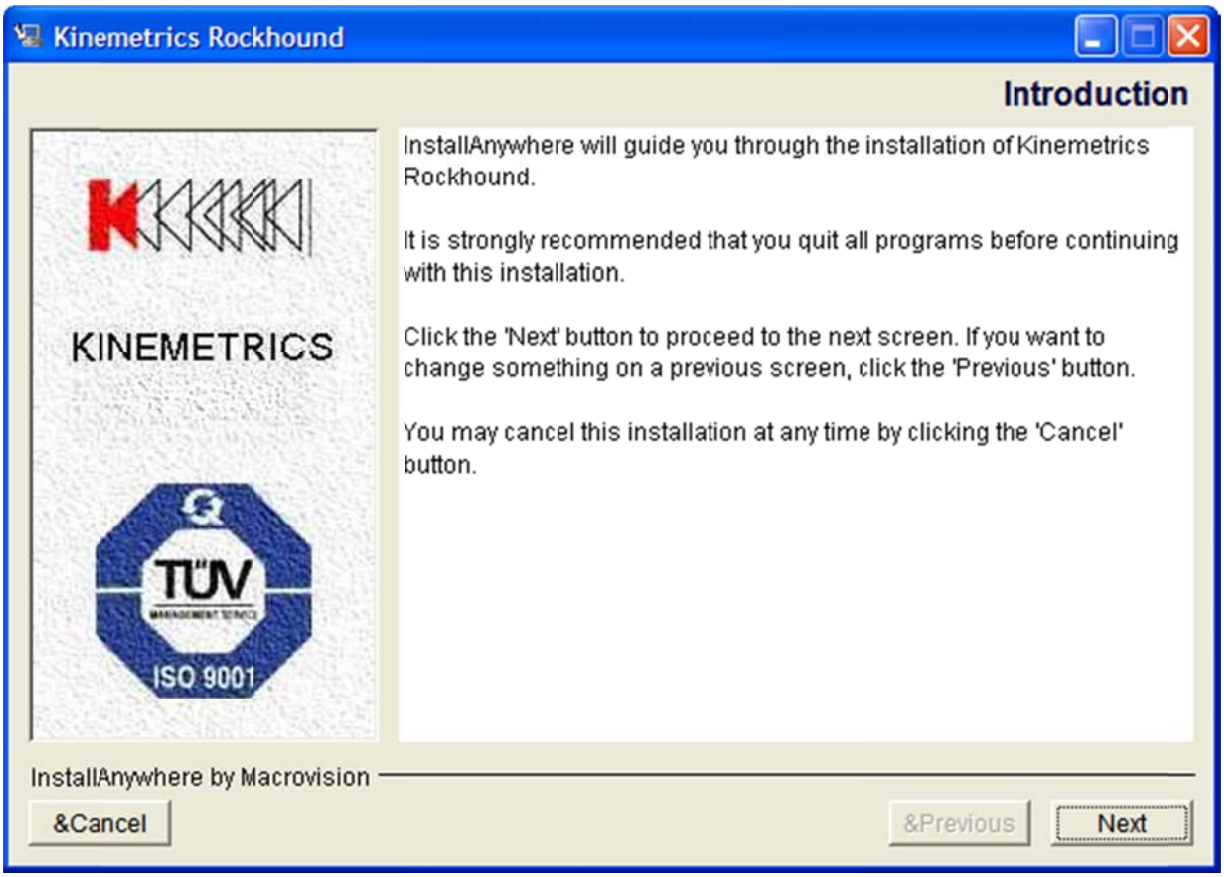
Install preparation

Next, you'll be allowed to select the locale (or language) for the installation. This is a standard InstallAnywhere feature, and will change the standardized messages of the installer.



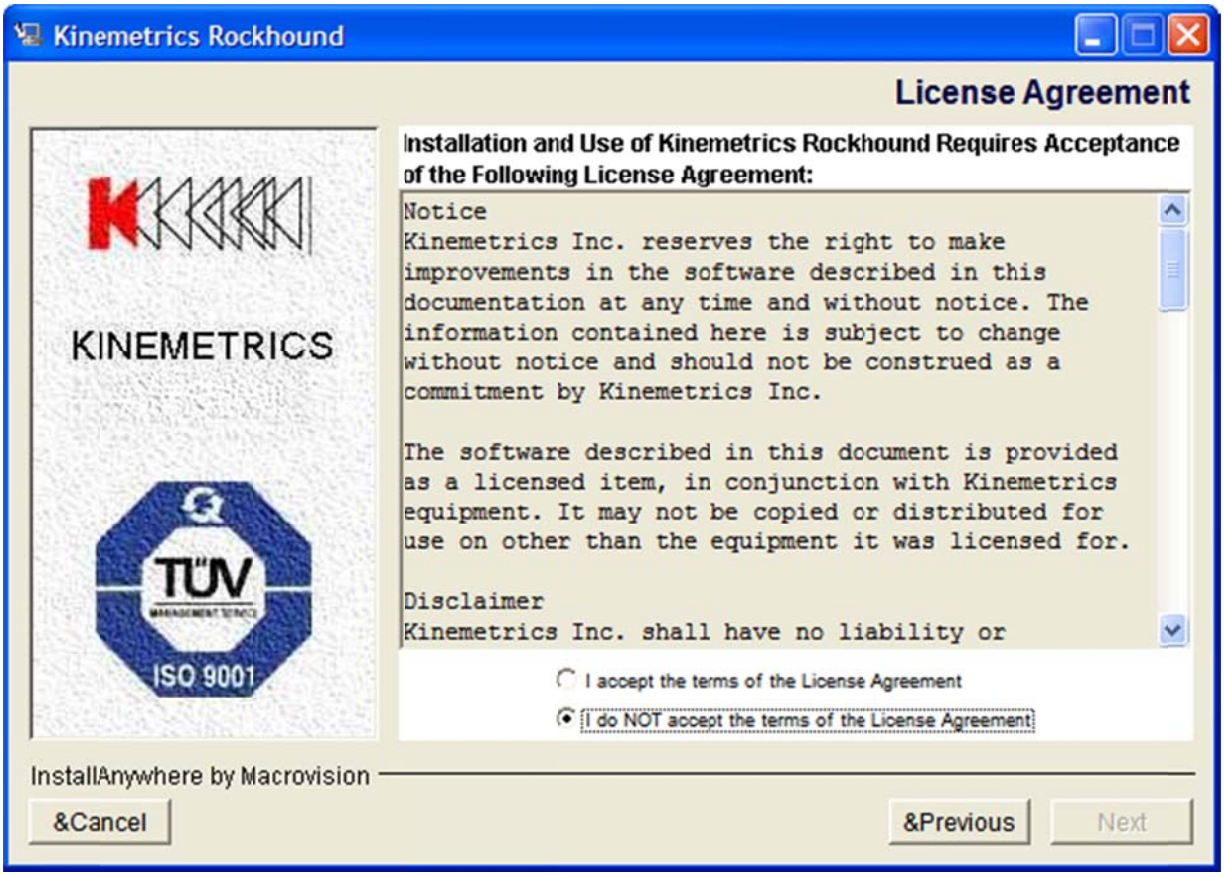
Install locale selection

After selecting the locale, several screens will display to step through the installation process. First is the screen indicating that the installer is ready to begin:


Kinemetrics Rockhound
Introduction
KINEMETRICS
TÜV
ISO 9001
InstallAnywhere will guide you through the installation of Kinemetrics Rockhound.
It is strongly recommended that you quit all programs before continuing with this installation.
Click the 'Next' button to proceed to the next screen. If you want to change something on a previous screen, click the 'Previous' button.
You may cancel this installation at any time by clicking the 'Cancel' button.
InstallAnywhere by Macrovision
&Cancel
&Previous
Next

Install ready to begin

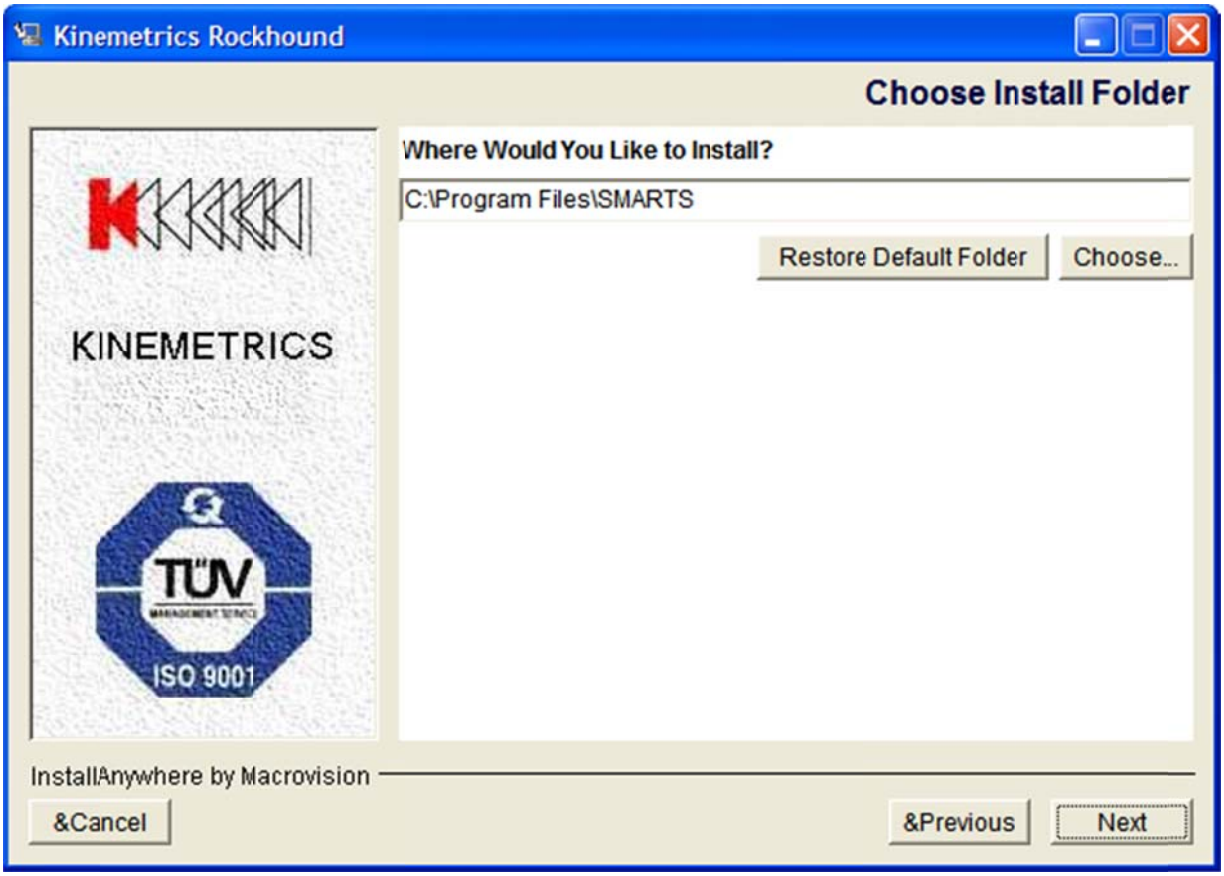
Following this is the Kinemetrics software license agreement:


Kinemetrics Rockhound
License Agreement
KINEMETRICS
TÜV
ISO 9001
Installation and Use of Kinemetrics Rockhound Requires Acceptance of the Following License Agreement:
Notice
Kinemetrics Inc. reserves the right to make improvements in the software described in this documentation at any time and without notice. The information contained here is subject to change without notice and should not be construed as a commitment by Kinemetrics Inc.
The software described in this document is provided as a licensed item, in conjunction with Kinemetrics equipment. It may not be copied or distributed for use on other than the equipment it was licensed for.
Disclaimer
Kinemetrics Inc. shall have no liability or
I accept the terms of the License Agreement
I do NOT accept the terms of the License Agreement
InstallAnywhere by Macrovision
&Cancel
&Previous
Next

Install license agreement

The next screen selects the installation folder. Kinemetrics recommends that the software be installed in the default folder. The rest of the examples in the installation section will assume that the software is installed into `D:\Program Files\SMARTS`.

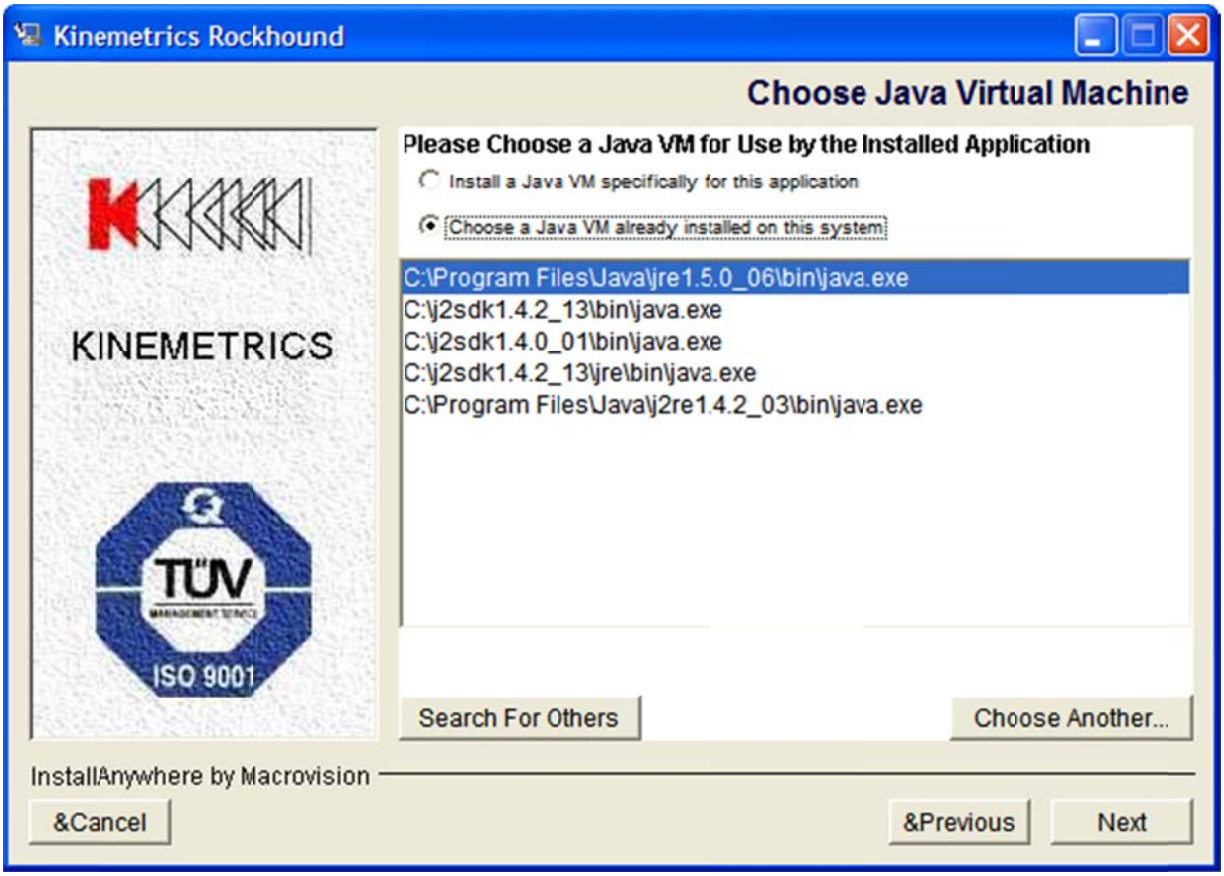
NOTE: That on Windows Vista, Rockhound cannot be installed into Program Files because of restrictions that Windows Vista places on programs in the Program Files directory. For Windows Vista, we recommend that you install Rockhound off of the root directory into a folder like \Rockhound\SMARTS.



Choosing the install folder

Now you will be asked to select the JVM that will be used to run the Rockhound code. Kinemetrics recommends that you select the JVM that is shipped with the Rockhound software. If you don't see any choices at this point, quit the installation and go back to the step "Installing the JVM".

If you know you have a compatible JVM already installed and would like to use it, select "Choose a virtual machine..." and then make the appropriate choice. Click Next.



Choose the JVM

The screens that follow may indicate that the installation has changed your environment variables, and that the computer will have to be rebooted for the changes required by the installation to be complete. **When the installation is totally completed, reboot your computer.**

Additional Installation notes

In order to run Rockhound firmware or support software, your computer must be configured to support TCP/IP. Setting up your computer for IP is not within the scope of this documentation. However, you should be able to "ping" another computer or use Telnet or FTP to communicate with another computer to prove this capability is properly set up before you proceed.

If you don't know what ping, Telnet, and FTP are, contact your system administrator or refer to your computer's documentation.

Running ROCKTalk

The installation process will have created icons or shortcuts on your system to ROCKTalk. ROCKTalk is the program that is used to communicate with one or more units from your computer. On most systems, no further installation should be necessary.

Note: On some versions of Windows, such as the Japanese version of Windows 98 - it may be necessary to manually create your own shortcut to the file `ROCKTalk.exe`.

See the section of this manual that describes ROCKTalk.

Running Rockhound on your computer

Running Rockhound on your computer (allowing your computer to act as a unit and thus directly control your digitizers) requires some additional steps. You DO NOT need to perform these steps if you only plan to run ROCKTalk.

For Windows:

If running Windows 98, or ME, you'll need to locate the file `winrun.bat` and make a copy of it (in the same directory) called `winrerun.bat`. After doing this, right click on the file icon and set the amount of environment memory to as large as possible, and select the "close on exit" option. Select APPLY and OK. Repeat this for both files. This should only be necessary at the first install.

For Windows NT through Windows Vista, no additional setup is required to enable these batch files.

To run Rockhound, run the batch file `winrun.bat`.

For Linux:

If you plan to have your unit communicate with the digitizer via an RS-232 connection, then perform the following additional steps:

Make the serial ports `/dev/ttyS0` and `/dev/ttyS1` read/write for all users. Note that these serial ports are specifically enabled for use in `unixrun.sh` this prevents the serial library from trying to access all possible ports in the world - taking longer to start AND generating lots of unneeded messages.

Reboot your computer.

To run Rockhound, run the script file `"sh unixrun.sh"`.

For Solaris:

Kinemetrics does not supply the necessary support libraries and instructions to support RS-232 interface to a digitizer. Most Sun workstations have few if any serial ports, and Kinemetrics believes that most digitizers controlled by Sun workstations will be interfaced via an IP connection.

If you feel you need to use Kinemetrics' Rockhound to control digitizers via RS-232 from a Sun workstation, contact Kinemetrics for further assistance.

To run Rockhound, run the script file `"sh unixrun.sh"`.

Once Rockhound is running, you will probably see a message at startup of the batch or script file that indicates that the Authorization code is missing, such as:

```
HWId: 00b0b9f246a2
Warning: Missing or invalid registration.
Demo Mode: Rockhound will halt in 12 hours!
```

This message means that authorization to use the Rockhound software must be obtained from Kinemetrics in order to use your computer as a unit. See the section on "Get Registration Information" in the ROCKTalk section of this manual, or contact Kinemetrics for further information.

On computers using the Windows Operating System, you may see a message such as:

```
HWId: JHWId ERROR
```

This most likely means that your computer is not set up with the NetBIOS service enabled. This service is required in order to get the hardware identification information from your computer necessary to run the Rockhound software.

5. Rockhound Modules

This section describes each Rockhound module in terms of its behavior, possible subscriptions, and parameters.

In the following examples, some parameter names or values are created using other values defined by Rockhound. These include:

'digitizer' = The name of the related digitizer
'digchannels' = The number of channels for this digitizer
'nchannels' = The total number of channels affected by this Rockhound configuration
'chan' = The current channel number
'plug-ins list' = The list of defined data plug-ins
'plug-in layouts list' = The list of user defined plug-in layouts

Available categories and modules

Each Rockhound module belongs to a category of similar modules. For example, there might be several different types of trigger filters available, but they all share one common feature - namely that they are all trigger filters. In other cases, such as the Voter, there might only be one choice.

When selections are made based on module category, the software will determine how many modules there are of that category. If there is only one module of that category, the software will choose that module without further user input. One the other hand, if there are several choices possible, then the software will ask the user to choose which module should be used.

Current categories and modules supported are:

Multichannel source for data
- Altus SDS Input from TCP/IP
- Altus SDS Input from RS232
- Q330 Input from UDP/IP
- Rock Data Interface
- MZD24 Data Interface
- TSASMA Data Interface
- Ring Buffer Data Interface
- Pseudo Data Waveform Generator (Advanced)

Data multichannel integrator
- Data Integrator

Status integrator
- Status Integrator

Channel extractor
- Channel Extractor

Channel trigger filter
- Classic Strong Motion Filter
- IIR-A Filter
- IIR-C Filter
- LPSRO Filter (Advanced)
- LPWWSS Filter (Advanced)
- GS21 Filter (Advanced)
- SPWWSS Filter (Advanced)

Channel trigger
- Threshold Trigger
- STA/LTA Trigger

Channel data filter
- DIY FIR Filter (Advanced)
- DIY IIR Filter (Advanced)
- Velocity IIR Filter (Advanced)
- Displacement IIR Filter (Advanced)
- Post-Integration IIR Filter (Advanced)

Voter
- Voter
- CGS Voter

Event recorder
- Recorder

Continuous recorder
- Continuous Recorder

File data formatter and archiver
- MiniSeed Format Data Archiver
- SAC Format Data Archiver
- COSMOS Format Data Archiver
- MATLAB Format Data Archiver
- SEISAN Format Data Archiver
- Altus EVT Format Data Archiver
- Text Format Data Archiver
- SUDS Format Data Archiver
- SEISLOG Format Data Archiver

Link to external data source
- NMS Queue Monitor

Auto File sender
- FTP File Sender
- SCP File Sender
- E-Mail File Sender

Command console
- Command console

System monitoring utilities
- Update monitor

Status Display GUI
- Status Display GUI (Desktop Only)
- PGA Alarms Display GUI (Desktop Only)

Status serving utilities
- Status Server

Auto file delete scanner
- Aged Auto File Delete
- Auto Oldest File Delete
- Auto Small EVT File Delete

Statistics generator
- Run Time Parameter Statistics
- Summary File Generator
- JMA Summary File Generator
- SOH File Generator

Web Server
- Config/Control web server

Telemetry connections
- Waveform viewer

Data Relay to transmit data stream
- DFS Telemetry (Advanced)
- SVDR Telemetry (Advanced)
- Altus Telemetry via RS-232
- Altus Telemetry via TCP/IP
- CGS Altus Telemetry via RS-232
- CGS Altus Telemetry via TCP/IP
- PPP Dial Generation
- QSCD Packet Telemetry

Local mirror of a data source
- SEEDLink Stream Mirrored to Disk

Ring Buffer Server
- Ring Buffer Server

Timed event alarm clock
- Alarm Clock

User notifier
- E-Mail Message Sender
- SMS Message Sender
- File Forwarder

Interconnect facilities
- Network Trigger

General Purpose IO interface
- Rock GPIO
- Rock PGA GPIO

OASIS Display GUI
- OASIS Display GUI (Desktop Only) (Advanced)

OASIS Data bridge
- OASIS Data Bridge (Advanced)

Mathematical integration of data (A-->V-->D)
- OASIS Mathematical Integrator (Advanced)

Computes drift between specified displacement channels
- OASIS Drift Computer (Advanced)

OASIS Statistics generator
- OASIS Statistics Generator

OASIS drift trigger
- OASIS Drift trigger (Advanced)

OASIS Alarm controller
- OASIS Alarm controller module (Advanced)

Channel pre-extractor
- Channel Pre-Extractor

Data processing plug-ins
- Data Plug-in Layout

Configuration information common to all Rockhound layouts

A few parameters are defined for every Rockhound system. These parameters are added to the smarts.cfg and/or hardware.cfg configuration files. Parameters added to smarts.cfg:

Data directory that will be scanned for available space by the Status Monitor
Name: DataDir
Type: String
Range: 1 to 100 characters
Default: \data
Example: DataDir=\data

If used, data directory used instead of the standard system temporary directory. The temporary data directory is used for working files such as the raw data recorded before it is converted to the final data output format. This could be used for example to relocate the temporary directory to an available SD card. If set to NONE, the standard system temporary directory is used. (Advanced)
Name: TempDataDir
Type: String
Range: 1 to 100 characters
Default: NONE
Example: TempDataDir=NONE

Spare space required on the file system in order to record new files (in KB). If remaining space is below this number, the system will not create new event files. (KMI only)
Name: DataCushion
Type: int
Range: 0 to 4000000
Default: 10000
Example: DataCushion=10000

Maximum size of log files in bytes (KMI only)
Name: MaxLogBytes
Type: int
Range: 1 to 409600000
Default: 102400
Example: MaxLogBytes=102400

Parameters added to hardware.cfg:

Unit identification string
Name: SMARTSId
Type: String
Range: 1 to 20 characters
Default: KMI
Example: SMARTSId=KMI

Network identification string
Name: NetworkId
Type: String
Range: 1 to 20 characters
Default: KM
Example: NetworkId=KM

Site identification string
Name: SiteId
Type: String
Range: 0 to 20 characters
Default: none
Example: SiteId=string

User defined comment string
Name: Comment
Type: String
Range: 0 to 64 characters
Default: none
Example: Comment=string

Number of channels total in this system
Name: NChannels
Type: int
Range: 1 to 99
Default: 'nchannels'
Example: NChannels='nchannels'

Multichannel source for data

Category: CHANNELDATASOURCE

The CHANNELDATASOURCE is normally the first module in a Rockhound data flow, and provides the interface to each of the digitizers which are attached to Rockhound.

It provides control of the communications link, communications protocols, configuration options, data retrieval, and Rockhound initiated control of a digitizer. Rockhound may have several CHANNELDATASOURCE modules providing data, limited by the available processing time.

Altus SDS Input from TCP/IP

Module name: AltusTCPFrontEnd

This module serves as the Rockhound interface to a Kinemetrics Altus recorder that is serving as a digitizer and is connected via a TCP/IP socket connection.

If Rockhound is connected to more than one Altus digitizer, then more than one FrontEnd module (either an AltusTCPFrontEnd or an AltusRS232FrontEnd) should be included in the Rockhound configuration layout.

The FrontEnd module does not subscribe to any other modules, but communicates with the Altus digitizer in Kinemetrics Serial Data Streams (SDS) mode.

On startup, the FrontEnd requests the current status of the Altus digitizer, and checks the various Altus parameters against the FrontEnd parameters to make sure they match. Parameters would include, but are not limited to sampling rate, SDS enabled, SDS buffer size, SDS compression mode, and selected channels.

If the Altus and FrontEnd parameters do not match, then the FrontEnd module will modify the Altus parameters and send them back to the Altus, and acquisition and SDS may or may not be restarted as needed.

Once the parameters of the Altus and FrontEnd match, several of the parameters are stored in the run time parameters of Rockhound so that they can be used by other modules (for example, for inclusion in recorded files). At this point, SDS data will be accepted from the digitizer and passed into the Rockhound system for further processing by the rest of the modules.

If the configuration of the Altus has not been changed, the FrontEnd will attempt to recover data missing since the last Rockhound shutdown. Missing data will not be recovered if the Altus SDS configuration has changed. The amount of data recovered depends on several things:

- The Size of the Altus SDS buffer
- The Retry Seconds parameter in hardware configuration
- The Recovery Limit parameter in the module configuration
- The amount of data actually in the SDS buffer

The default parameter settings will recover data as needed for up to 1800 seconds (30 minutes). "As Needed" is specified as the Recovery Limit parameter, and the 1800 seconds is specified as the Retry Seconds parameter.

NOTE 1: In order to use very long recovery limits (Retry Seconds set to more than 1800), you must make sure that there is sufficient SDS storage on the digitizer and that available bandwidth allows current data plus recovered data for extended periods of time - otherwise the missing data may never be recovered or will take an unacceptably long time. For large recovery limits, Altus firmware v2.99 or higher is recommended.

NOTE 2: Altus firmware v2.89 and below only support 100sps streaming data. Firmware versions 2.90 and later will support any of the sampling rates supported by the Rockhound Altus front end modules.

NOTE 3: Make sure that the Altus does not contain an internal modem, as this will interfere with Altus block mode communications needed for proper interface with Rockhound.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Host address of the incoming data socket
Name: 'digitizer'.Host
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.Host=string

TCP Port number for incoming data, should be greater than 2000
Name: 'digitizer'.TCPPort
Type: int
Range: 2000 to 32767
Default: none
Example: 'digitizer'.TCPPort=2000

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.001 to 10000.0
Default: 2.5
Example: 'digitizer'.ch'chan'.FullScale=2.5

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 32
Example: 'digitizer'.ch'chan'.SensorType=32

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Gain value for the channel - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Gain
Type: int
Range: 1 to 5000
Default: 1
Example: 'digitizer'.ch'chan'.Gain=1

EpiSensor gain value, should be set to match the sensor's jumper settings (1=2.5V range, 2=5.0V, 4=10V, 8=20V)
Name: 'digitizer'.ch'chan'.EpiGain
Type: choice
Choices: 1,2,4,8
Default: 2
Example: 'digitizer'.ch'chan'.EpiGain=2

EpiSensor range code, where 1=4g, 2=2g, ... 5=0.25g - should be set to match the sensor's jumper settings
Name: 'digitizer'.ch'chan'.EpiRange
Type: choice
Choices: 1,2,3,4,5
Default: 1
Example: 'digitizer'.ch'chan'.EpiRange=1

EpiSensor Cal Coil value in g/V. This is a factory calibrated value
Name: 'digitizer'.ch'chan'.EpiCalCoil
Type: double
Range: 0.05 to 0.10
Default: 0.05
Example: 'digitizer'.ch'chan'.EpiCalCoil=0.05

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Maximum retry request buffer time, in seconds. See Recovery Limit in the front end configuration.
Name: RetrySeconds
Type: int
Range: 1 to 1209600
Default: 1800
Example: RetrySeconds=1800

Maximum current data recovery buffer, in packets. Limits how much current data can be queued as recovery progresses. Should be made smaller on systems with many digitizers and small memory.
Name: RecoveryQueueLimit
Type: int
Range: 1 to 1209600
Default: 3000
Example: RecoveryQueueLimit=3000

Parameters added to module specific .cfg file:

Sampling rate, in SPS [NOTES: 1) Etna supports 100,200,250sps only. 2) Values other than 100sps allowed in Altus App version 2.96 or higher only!]
Name: SPS
Type: choice
Choices: 20,40,50,100,200,250
Default: 100
Example: SPS=100

Number of channels produced by this digitizer
Name: NDigitizerChannels
Type: int
Range: 1 to 6
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

List of channels to be sent, e.g.: 1,2,3. NOTE: Number of selected channels MUST be less or equal to the number of channels to be produced by this digitizer.
Name: Channels
Type: String
Range: 1 to 80 characters
Default: 1,2,3
Example: Channels=1,2,3

Record temperature stream as .deg
Name: Temperature
Type: boolean
Default: true
Example: Temperature=true

Record VofV12Batt stream as .vvb
Name: VofV12Batt
Type: boolean
Default: false
Example: VofV12Batt=false

Record time quality stream as .lcq
Name: TimeQual
Type: boolean
Default: true
Example: TimeQual=true

Difference compression of the data stream
Name: Compress
Type: boolean
Default: true
Example: Compress=true

Buffer size of Altus ring buffer in 16kb blocks
Name: Buffer
Type: int
Range: 0 to 65535
Default: 64
Example: Buffer=64

Maximum amount of data to recover from the real-time stream when unit restarts. See Retry Seconds in hardware configuration
Name: Recover
Type: choice
Choices: As Needed,None,10 min,20 min,30 min,1 hr,2 hr,4 hr,8 hr
Default: None
Example: Recover=None

This digitizer is optional. If selected and initial connection to the digitizer fails, then the unit will continue to operate without it. If not optional, a successful connection is required or the unit will restart.
Name: OptionalDigitizer
Type: boolean
Default: false
Example: OptionalDigitizer=false

Drum recorder special simplex communication mode. This is intended only for specialized use with drum recorder output. In this mode, Rockhound will only listen to the Altus and will not send any data. Any control of the Altus will be done by someone else (such as an upstream Earthworm, Antelope, or NMS client). In particular, recovery is the responsibility of the upstream host, though a short timeout for the DataIntegrator is recommended (10-15 seconds) to keep data flowing in the case of an opccasional non-recovered packet loss. SOH channels will not be published. This module's parameters should be set up to match those of the Altus for channel count, sample rate, and other parameters. (Advanced)
Name: DrumMode
Type: boolean
Default: false
Example: DrumMode=false

Altus SDS Input from RS232

Module name: AltusRS232FrontEnd

Same as an AltusTCPFrontEnd, except that the recorder is connected via an RS-232 connection rather than via a TCP/IP socket connection.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.001 to 10000.0
Default: 2.5
Example: 'digitizer'.ch'chan'.FullScale=2.5

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 32
Example: 'digitizer'.ch'chan'.SensorType=32

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Gain value for the channel - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Gain
Type: int
Range: 1 to 5000
Default: 1
Example: 'digitizer'.ch'chan'.Gain=1

EpiSensor gain value, should be set to match the sensor's jumper settings (1=2.5V range, 2=5.0V, 4=10V, 8=20V)
Name: 'digitizer'.ch'chan'.EpiGain
Type: choice
Choices: 1,2,4,8
Default: 2
Example: 'digitizer'.ch'chan'.EpiGain=2

EpiSensor range code, where 1=4g, 2=2g, ... 5=0.25g - should be set to match the sensor's jumper settings
Name: 'digitizer'.ch'chan'.EpiRange
Type: choice
Choices: 1,2,3,4,5
Default: 1
Example: 'digitizer'.ch'chan'.EpiRange=1

EpiSensor Cal Coil value in g/V. This is a factory calibrated value
Name: 'digitizer'.ch'chan'.EpiCalCoil
Type: double
Range: 0.05 to 0.10
Default: 0.05
Example: 'digitizer'.ch'chan'.EpiCalCoil=0.05

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Maximum retry request buffer time, in seconds. See Recovery Limit in the front end configuration.
Name: RetrySeconds
Type: int
Range: 1 to 1209600
Default: 1800
Example: RetrySeconds=1800

Maximum current data recovery buffer, in packets. Limits how much current data can be queued as recovery progresses. Should be made smaller on systems with many digitizers and small memory.
Name: RecoveryQueueLimit
Type: int
Range: 1 to 1209600
Default: 3000
Example: RecoveryQueueLimit=3000

Parameters added to module specific .cfg file:

COM port specification, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: ComPort
Type: String
Range: 1 to 80 characters
Default: /dev/ttyS1
Example: ComPort=/dev/ttyS1

Serial baud rate
Name: Baud
Type: choice
Choices: 2400,4800,9600,19200,38400,57600
Default: 57600
Example: Baud=57600

Sampling rate, in SPS [NOTES: 1) Etna supports 100,200,250sps only. 2) Values other than 100sps allowed in Altus App version 2.96 or higher only!]
Name: SPS
Type: choice
Choices: 20,40,50,100,200,250
Default: 100
Example: SPS=100

Number of channels produced by this digitizer
Name: NDigitizerChannels
Type: int
Range: 1 to 6
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

List of channels to be sent, e.g.: 1,2,3. NOTE: Number of selected channels MUST be less or equal to the number of channels to be produced by this digitizer.
Name: Channels
Type: String
Range: 1 to 80 characters
Default: 1,2,3
Example: Channels=1,2,3

Record temperature stream as .deg
Name: Temperature
Type: boolean
Default: true
Example: Temperature=true

Record VofV12Batt stream as .vvb
Name: VofV12Batt
Type: boolean
Default: false
Example: VofV12Batt=false

Record time quality stream as .lcq
Name: TimeQual
Type: boolean
Default: true
Example: TimeQual=true

Difference compression of the data stream
Name: Compress
Type: boolean
Default: true
Example: Compress=true

Buffer size of Altus ring buffer in 16kb blocks
Name: Buffer
Type: int
Range: 0 to 65535
Default: 64
Example: Buffer=64

Maximum amount of data to recover from the real-time stream when the unit restarts. See Retry Seconds in hardware configuration
Name: Recover
Type: choice
Choices: As Needed,None,10 min,20 min,30 min,1 hr,2 hr,4 hr,8 hr
Default: None
Example: Recover=None

This digitizer is optional. If selected and initial connection to the digitizer fails, then the unit will continue to operate without it. If not optional, a successful connection is required or the unit will restart.
Name: OptionalDigitizer
Type: boolean
Default: false
Example: OptionalDigitizer=false

Advanced serial port settings for data bits, parity, etc. (Default is 8 bits, no parity, 1 stop bit) (Advanced)
Name: ComSettings
Type: String
Range: 0 to 80 characters
Default: none
Example: ComSettings=string

Drum recorder special simplex communication mode. This is intended only for specialized use with drum recorder output. In this mode, Rockhound will only listen to the Altus and will not send any data. Any control of the Altus will be done by someone else (such as an upstream Earthworm, Antelope, or NMS client). In particular, recovery is the responsibility of the upstream host, though a short timeout for the DataIntegrator is recommended (10-15 seconds) to keep data flowing in the case of an opccasional non-recovered packet loss. SOH channels will not be published. This module's parameters should be set up to match those of the Altus for channel count, sample rate, and other parameters. (Advanced)
Name: DrumMode
Type: boolean
Default: false
Example: DrumMode=false

Q330 Input from UDP/IP

Module name: Q330FrontEnd

This module serves as the Rockhound interface to a Kinemetrics/Quanterra Q330 digitizer that is connected via a UDP/IP socket connection.

If Rockhound is connected to more than one Q330 digitizer, then more than one Q330FrontEnd module should be included in the Rockhound configuration layout.

The FrontEnd module does not subscribe to any other modules, but simply communicates with the Q330 digitizer using the Q330's binary packet protocol.

On startup, the FrontEnd requests the current status of the Q330 digitizer, and checks the various parameters against the FrontEnd parameters to make sure they match. Parameters would include, but are not limited to sampling rate and selected channels.

If the Q330 and FrontEnd parameters do not match, then the FrontEnd module will modify the Q330 parameters and send them back to the Q330.

Once the parameters of the Q330 and FrontEnd match, several of the parameters are stored in the run time parameters of Rockhound so that they can be used by other modules (for example, for inclusion in recorded files). At this point, data will be accepted from the digitizer and passed into the Rockhound system for further processing by the rest of the modules.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 10.0
Example: 'digitizer'.ch'chan'.Sensitivity=10.0

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.001 to 10000.0
Default: 20.0
Example: 'digitizer'.ch'chan'.FullScale=20.0

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 32
Example: 'digitizer'.ch'chan'.SensorType=32

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Gain value for the channel
Name: 'digitizer'.ch'chan'.Gain
Type: int
Range: 1 to 5000
Default: 1
Example: 'digitizer'.ch'chan'.Gain=1

EpiSensor gain value, should be set to match the sensor's jumper settings (1=2.5V range, 2=5.0V, 4=10V, 8=20V)
Name: 'digitizer'.ch'chan'.EpiGain
Type: choice
Choices: 1,2,4,8
Default: 2
Example: 'digitizer'.ch'chan'.EpiGain=2

EpiSensor range code, where 1=4g, 2=2g, ... 5=0.25g - should be set to match the sensor's jumper settings
Name: 'digitizer'.ch'chan'.EpiRange
Type: choice
Choices: 1,2,3,4,5
Default: 1
Example: 'digitizer'.ch'chan'.EpiRange=1

EpiSensor Cal Coil value in g/V. This is a factory calibrated value
Name: 'digitizer'.ch'chan'.EpiCalCoil
Type: double
Range: 0.05 to 0.10
Default: 0.05
Example: 'digitizer'.ch'chan'.EpiCalCoil=0.05

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Retry request time, in seconds
Name: RetrySeconds
Type: int
Range: 1 to 14400
Default: 300
Example: RetrySeconds=300

Authorization code for Q330 connection
Name: 'digitizer'.AuthCode
Type: String
Range: 1 to 80 characters
Default: 0000000000000000
Example: 'digitizer'.AuthCode=0000000000000000

Host address of the Q330 connection
Name: 'digitizer'.Host
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.Host=string

Serial number for the Q330
Name: 'digitizer'.SerialNo
Type: String
Range: 1 to 80 characters
Default: none
Example: 'digitizer'.SerialNo=string

Logical port connection for Q330 connection
Name: 'digitizer'.LogicalPort
Type: int
Range: 1 to 4
Default: 1
Example: 'digitizer'.LogicalPort=1

Base port for local IP port assignments. Default should be good for all standard applications. If more than one copy of the firmware will be run on any one computer, offset this base port number by 50 for each copy of the firmware.
Name: 'digitizer'.LocalBasePort
Type: int
Range: 5000 to 32767
Default: 9700
Example: 'digitizer'.LocalBasePort=9700

Base port for Q330 IP port assignments. Must match base port assignment in Q330. Usually unchanged.
Name: 'digitizer'.BasePort
Type: int
Range: 5000 to 32767
Default: 5330
Example: 'digitizer'.BasePort=5330

Power Cycled Operation - possible with Q330s if Q330 parameters and hardware systems properly configured
Name: PowerCycledMode
Type: boolean
Default: false
Example: PowerCycledMode=false

Parameters added to module specific .cfg file:

Number of virtual channels (data streams) produced by this digitizer
Name: NDigitizerChannels
Type: int
Range: 1 to 6
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

Number of physical channels on this digitizer. NOTE! After changing the number of physical channels, save by pressing OK, and THEN change channel mapping.
Name: NPhysicalChannels
Type: choice
Choices: 3,6
Default: 'physical channels'
Example: NPhysicalChannels='physical channels'

Unit architecture type. Used to compensate for minor protocol differences between models of the Q330 family
Name: ArchType
Type: choice
Choices: Q330,Q330HR,Q330S,Q330S+
Default: Q330
Example: ArchType=Q330

Channel mapping. See Physical Channels parameter. NOTE that high frequency rates of 250, 500, and 1000 are only applicable to the Q330S+, and that ONLY ONE high rate may be used at a time.
Name: VChxx
Type: mapping
Choices: 1sps,10sps,20sps,40sps,50sps,100sps,200sps,250sps,500sps,1000sps
Default: none
Example: VChxx=mapping

Number of auxiliary channels, must be accounted for in the total number of channels for the system
Name: NAuxChannels
Type: choice
Choices: 0,4,8
Default: 0
Example: NAuxChannels=0

This digitizer is optional. If selected and connection to the digitizer fails, then the system will continue to operate without it. If not optional, a successful connection must be maintained or the system will restart.
Name: Survivability
Type: boolean
Default: false
Example: Survivability=false

Record temperature stream as .deg
Name: Temperature
Type: boolean
Default: false
Example: Temperature=false

Record input voltage stream as .vep
Name: VEP
Type: boolean
Default: false
Example: VEP=false

Record system current stream as .vec
Name: VEC
Type: boolean
Default: false
Example: VEC=false

Record antenna current stream as .vea
Name: VEA
Type: boolean
Default: false
Example: VEA=false

Record voltage controlled oscillator offset stream as .vco
Name: VCO
Type: boolean
Default: false
Example: VCO=false

Record clock quality stream as .lcq
Name: LCQ
Type: boolean
Default: false
Example: LCQ=false

Record clock phase stream as .lce
Name: LCE
Type: boolean
Default: false
Example: LCE=false

Mass position channel 1 as .vm1
Name: VM1
Type: boolean
Default: false
Example: VM1=false

Mass position channel 2 as .vm2
Name: VM2
Type: boolean
Default: false
Example: VM2=false

Mass position channel 3 as .vm3
Name: VM3
Type: boolean
Default: false
Example: VM3=false

Mass position channel 4 as .vm4
Name: VM4
Type: boolean
Default: false
Example: VM4=false

Mass position channel 5 as .vm5
Name: VM5
Type: boolean
Default: false
Example: VM5=false

Mass position channel 6 as .vm6
Name: VM6
Type: boolean
Default: false
Example: VM6=false

Type of sensor calibration function
Name: SensorCalType
Type: choice
Choices: 0 - Sine,1 - Red noise,2 - White noise,3 - Step,4 - Random telegraph
Default: 0 - Sine
Example: SensorCalType=0 - Sine

Sensor calibration duration in seconds
Name: SensorCalDurationSec
Type: int
Range: 1 to 7200
Default: 30
Example: SensorCalDurationSec=30

Connection recheck interval in seconds (Dynamic Parameter)
Name: ConnectionRecheck
Type: int
Range: 60 to 500000
Default: 86400
Example: ConnectionRecheck=86400

Flush Q330 packet buffer on connect
Name: FlushOnConnect
Type: boolean
Default: false
Example: FlushOnConnect=false

Rock Data Interface

Module name: RockFrontEnd

This module is a Rock digitizer front end. This module is used in Rock family digitizers such as the Basalt and Granite.

The Rock front end interfaces with the Rock digitizer's data acquisition hardware in order to produce a data stream which can be further processed by the included Rockhound software also installed on the digitizer to allow event recording, continuous recording, or telemetry.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files. NOTE that full scale ranges must be identical for each set of physical channels 1-3, 5-7, 9-11, 13-15, 17-19, etc.
Name: 'digitizer'.ch'chan'.FullScale
Type: choice
Choices: 2.5,5.0,20.0
Default: 2.5
Example: 'digitizer'.ch'chan'.FullScale=2.5

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 32
Example: 'digitizer'.ch'chan'.SensorType=32

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Gain value for the channel - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Gain
Type: int
Range: 1 to 5000
Default: 1
Example: 'digitizer'.ch'chan'.Gain=1

EpiSensor gain value, should be set to match the sensor's jumper settings (1=2.5V range, 2=5.0V, 4=10V, 8=20V)
Name: 'digitizer'.ch'chan'.EpiGain
Type: choice
Choices: 1,2,4,8
Default: 2
Example: 'digitizer'.ch'chan'.EpiGain=2

EpiSensor range code, where 1=4g, 2=2g, ... 5=0.25g - should be set to match the sensor's jumper settings
Name: 'digitizer'.ch'chan'.EpiRange
Type: choice
Choices: 1,2,3,4,5
Default: 1
Example: 'digitizer'.ch'chan'.EpiRange=1

EpiSensor Cal Coil value in g/V. This is a factory calibrated value
Name: 'digitizer'.ch'chan'.EpiCalCoil
Type: double
Range: 0.05 to 0.10
Default: 0.05
Example: 'digitizer'.ch'chan'.EpiCalCoil=0.05

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Maximum retry request buffer time, in seconds. See Recovery Limit in the front end configuration.
Name: RetrySeconds
Type: int
Range: 1 to 1209600
Default: 1800
Example: RetrySeconds=1800

Channel ID string for the deg SOH channel (if not set, uses default name) (Advanced)
Name: Temperature.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.Id=string

Channel ID string for the hum SOH channel (if not set, uses default name) (Advanced)
Name: Humidity.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.Id=string

Channel ID string for the vvb SOH channel (if not set, uses default name) (Advanced)
Name: VofV12Batt.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.Id=string

Channel ID string for the vep SOH channel (if not set, uses default name) (Advanced)
Name: VofSysPwr.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.Id=string

Channel ID string for the vec SOH channel (if not set, uses default name) (Advanced)
Name: IofSysPwr.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.Id=string

Channel ID string for the lcq SOH channel (if not set, uses default name) (Advanced)
Name: TimeQual.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.Id=string

Channel ID string for the lce SOH channel (if not set, uses default name) (Advanced)
Name: TCXODrift.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODrift.Id=string

Channel ID string for the cpu SOH channel (if not set, uses default name) (Advanced)
Name: LoadAverage.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.Id=string

Channel ID string for the dsk SOH channel (if not set, uses default name) (Advanced)
Name: PercentUsed.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.Id=string

Channel ID string for the mem SOH channel (if not set, uses default name) (Advanced)
Name: RAMUsed.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: RAMUsed.Id=string

Channel ID string for the vco SOH channel (if not set, uses default name) (Advanced)
Name: TCXODAC.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODAC.Id=string

Channel ID string for the usr SOH channel (if not set, uses default name) (Advanced)
Name: UserStat.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.Id=string

ID string of mass position for channel 1 of this 4 channel group (if not set, uses default name) (Advanced)
Name: MPos'ADC board'1.Id
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'1.Id=string

ID string of mass position for channel 2 of this 4 channel group (if not set, uses default name) (Advanced)
Name: MPos'ADC board'2.Id
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'2.Id=string

ID string of mass position for channel 3 of this 4 channel group (if not set, uses default name) (Advanced)
Name: MPos'ADC board'3.Id
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'3.Id=string

Location Code for the deg SOH channel (Advanced)
Name: Temperature.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.Loc=string

Location Code for the hum SOH channel (Advanced)
Name: Humidity.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.Loc=string

Location Code for the vvb SOH channel (Advanced)
Name: VofV12Batt.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.Loc=string

Location Code for the vep SOH channel (Advanced)
Name: VofSysPwr.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.Loc=string

Location Code for the vec SOH channel (Advanced)
Name: IofSysPwr.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.Loc=string

Location Code for the lcq SOH channel (Advanced)
Name: TimeQual.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.Loc=string

Location Code for the lce SOH channel (Advanced)
Name: TCXODrift.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODrift.Loc=string

Location Code for the cpu SOH channel (Advanced)
Name: LoadAverage.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.Loc=string

Location Code for the dsk SOH channel (Advanced)
Name: PercentUsed.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.Loc=string

Location Code for the mem SOH channel (Advanced)
Name: RAMUsed.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: RAMUsed.Loc=string

Location Code for the vco SOH channel (Advanced)
Name: TCXODAC.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODAC.Loc=string

Location Code for the usr SOH channel (Advanced)
Name: UserStat.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.Loc=string

Location Code of mass position for channel 1 of this 4 channel group (Advanced)
Name: MPos'ADC board'1.Loc
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'1.Loc=string

Location Code of mass position for channel 2 of this 4 channel group (Advanced)
Name: MPos'ADC board'2.Loc
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'2.Loc=string

Location Code of mass position for channel 3 of this 4 channel group (Advanced)
Name: MPos'ADC board'3.Loc
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'3.Loc=string

Network Code for the deg SOH channel (Advanced)
Name: Temperature.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.NwId=string

Network Code for the hum SOH channel (Advanced)
Name: Humidity.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.NwId=string

Network Code for the vvb SOH channel (Advanced)
Name: VofV12Batt.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.NwId=string

Network Code for the vep SOH channel (Advanced)
Name: VofSysPwr.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.NwId=string

Network Code for the vec SOH channel (Advanced)
Name: IofSysPwr.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.NwId=string

Network Code for the lcq SOH channel (Advanced)
Name: TimeQual.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.NwId=string

Network Code for the lce SOH channel (Advanced)
Name: TCXODrift.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODrift.NwId=string

Network Code for the cpu SOH channel (Advanced)
Name: LoadAverage.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.NwId=string

Network Code for the dsk SOH channel (Advanced)
Name: PercentUsed.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.NwId=string

Network Code for the mem SOH channel (Advanced)
Name: RAMUsed.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: RAMUsed.NwId=string

Network Code for the vco SOH channel (Advanced)
Name: TCXODAC.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODAC.NwId=string

Network Code for the usr SOH channel (Advanced)
Name: UserStat.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.NwId=string

Network Code of mass position for channel 1 of this 4 channel group (Advanced)
Name: MPos'ADC board'1.NwId
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'1.NwId=string

Network Code of mass position for channel 2 of this 4 channel group (Advanced)
Name: MPos'ADC board'2.NwId
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'2.NwId=string

Network Code of mass position for channel 3 of this 4 channel group (Advanced)
Name: MPos'ADC board'3.NwId
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'3.NwId=string

Station Code for the deg SOH channel (Advanced)
Name: Temperature.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.StnId=string

Station Code for the hum SOH channel (Advanced)
Name: Humidity.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.StnId=string

Station Code for the vvb SOH channel (Advanced)
Name: VofV12Batt.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.StnId=string

Station Code for the vep SOH channel (Advanced)
Name: VofSysPwr.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.StnId=string

Station Code for the vec SOH channel (Advanced)
Name: IofSysPwr.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.StnId=string

Station Code for the lcq SOH channel (Advanced)
Name: TimeQual.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.StnId=string

Station Code for the lce SOH channel (Advanced)
Name: TCXODrift.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODrift.StnId=string

Station Code for the cpu SOH channel (Advanced)
Name: LoadAverage.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.StnId=string

Station Code for the dsk SOH channel (Advanced)
Name: PercentUsed.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.StnId=string

Station Code for the mem SOH channel (Advanced)
Name: RAMUsed.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: RAMUsed.StnId=string

Station Code for the vco SOH channel (Advanced)
Name: TCXODAC.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: TCXODAC.StnId=string

Station Code for the usr SOH channel (Advanced)
Name: UserStat.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.StnId=string

Station Code of mass position for channel 1 of this 4 channel group (Advanced)
Name: MPos'ADC board'1.StnId
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'1.StnId=string

Station Code of mass position for channel 2 of this 4 channel group (Advanced)
Name: MPos'ADC board'2.StnId
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'2.StnId=string

Station Code of mass position for channel 3 of this 4 channel group (Advanced)
Name: MPos'ADC board'3.StnId
Type: bdgroup
Selections for each ADC board
Default: none
Example: MPos'ADC board'3.StnId=string

Calib value for the deg SOH channel (Advanced)
Name: Temperature.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: Temperature.Calib=0.0

Calib value for the hum SOH channel (Advanced)
Name: Humidity.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: Humidity.Calib=0.0

Calib value for the vvb SOH channel (Advanced)
Name: VofV12Batt.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: VofV12Batt.Calib=0.0

Calib value for the vep SOH channel (Advanced)
Name: VofSysPwr.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: VofSysPwr.Calib=0.0

Calib value for the vec SOH channel (Advanced)
Name: IofSysPwr.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: IofSysPwr.Calib=0.0

Calib value for the lcq SOH channel (Advanced)
Name: TimeQual.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: TimeQual.Calib=0.0

Calib value for the lce SOH channel (Advanced)
Name: TCXODrift.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: TCXODrift.Calib=0.0

Calib value for the cpu SOH channel (Advanced)
Name: LoadAverage.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: LoadAverage.Calib=0.0

Calib value for the dsk SOH channel (Advanced)
Name: PercentUsed.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: PercentUsed.Calib=0.0

Calib value for the mem SOH channel (Advanced)
Name: RAMUsed.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: RAMUsed.Calib=0.0

Calib value for the vco SOH channel (Advanced)
Name: TCXODAC.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: TCXODAC.Calib=0.0

Calib value for the usr SOH channel (Advanced)
Name: UserStat.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: UserStat.Calib=0.0

Calib value of mass position for channel 1 of this 4 channel group (Advanced)
Name: MPos'ADC board'1.Calib
Type: bddouble
Range: -1000000 to 1000000
Default: 0.0
Example: MPos'ADC board'1.Calib=0.0

Calib value of mass position for channel 2 of this 4 channel group (Advanced)
Name: MPos'ADC board'2.Calib
Type: bddouble
Range: -1000000 to 1000000
Default: 0.0
Example: MPos'ADC board'2.Calib=0.0

Calib value of mass position for channel 3 of this 4 channel group (Advanced)
Name: MPos'ADC board'3.Calib
Type: bddouble
Range: -1000000 to 1000000
Default: 0.0
Example: MPos'ADC board'3.Calib=0.0

Calper value for the deg SOH channel (Advanced)
Name: Temperature.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: Temperature.Calper=-1.0

Calper value for the hum SOH channel (Advanced)
Name: Humidity.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: Humidity.Calper=-1.0

Calper value for the vvb SOH channel (Advanced)
Name: VofV12Batt.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: VofV12Batt.Calper=-1.0

Calper value for the vep SOH channel (Advanced)
Name: VofSysPwr.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: VofSysPwr.Calper=-1.0

Calper value for the vec SOH channel (Advanced)
Name: IofSysPwr.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: IofSysPwr.Calper=-1.0

Calper value for the lcq SOH channel (Advanced)
Name: TimeQual.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: TimeQual.Calper=-1.0

Calper value for the lce SOH channel (Advanced)
Name: TCXODrift.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: TCXODrift.Calper=-1.0

Calper value for the cpu SOH channel (Advanced)
Name: LoadAverage.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: LoadAverage.Calper=-1.0

Calper value for the dsk SOH channel (Advanced)
Name: PercentUsed.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: PercentUsed.Calper=-1.0

Calper value for the mem SOH channel (Advanced)
Name: RAMUsed.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: RAMUsed.Calper=-1.0

Calper value for the vco SOH channel (Advanced)
Name: TCXODAC.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: TCXODAC.Calper=-1.0

Calper value for the usr SOH channel (Advanced)
Name: UserStat.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: UserStat.Calper=-1.0

Calper value of mass position for channel 1 of this 4 channel group (Advanced)
Name: MPos'ADC board'1.Calper
Type: bddouble
Range: -9999 to 9999
Default: -1.0
Example: MPos'ADC board'1.Calper=-1.0

Calper value of mass position for channel 2 of this 4 channel group (Advanced)
Name: MPos'ADC board'2.Calper
Type: bddouble
Range: -9999 to 9999
Default: -1.0
Example: MPos'ADC board'2.Calper=-1.0

Calper value of mass position for channel 3 of this 4 channel group (Advanced)
Name: MPos'ADC board'3.Calper
Type: bddouble
Range: -9999 to 9999
Default: -1.0
Example: MPos'ADC board'3.Calper=-1.0

Segment Type for the deg SOH channel (Advanced)
Name: Temperature.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: Temperature.Seg=-

Segment Type for the hum SOH channel (Advanced)
Name: Humidity.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: Humidity.Seg=-

Segment Type for the vvb SOH channel (Advanced)
Name: VofV12Batt.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: VofV12Batt.Seg=-

Segment Type for the vep SOH channel (Advanced)
Name: VofSysPwr.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: VofSysPwr.Seg=-

Segment Type for the vec SOH channel (Advanced)
Name: IofSysPwr.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: IofSysPwr.Seg=-

Segment Type for the lcq SOH channel (Advanced)
Name: TimeQual.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: TimeQual.Seg=-

Segment Type for the lce SOH channel (Advanced)
Name: TCXODrift.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: TCXODrift.Seg=-

Segment Type for the cpu SOH channel (Advanced)
Name: LoadAverage.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: LoadAverage.Seg=-

Segment Type for the dsk SOH channel (Advanced)
Name: PercentUsed.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: PercentUsed.Seg=-

Segment Type for the mem SOH channel (Advanced)
Name: RAMUsed.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: RAMUsed.Seg=-

Segment Type for the vco SOH channel (Advanced)
Name: TCXODAC.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: TCXODAC.Seg=-

Segment Type for the usr SOH channel (Advanced)
Name: UserStat.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: UserStat.Seg=-

Segment Type of mass position for channel 1 of this 4 channel group (Advanced)
Name: MPos'ADC board'1.Seg
Type: bdgroup
Selections for each ADC board
Default: -
Example: MPos'ADC board'1.Seg=-

Segment Type of mass position for channel 2 of this 4 channel group (Advanced)
Name: MPos'ADC board'2.Seg
Type: bdgroup
Selections for each ADC board
Default: -
Example: MPos'ADC board'2.Seg=-

Segment Type of mass position for channel 3 of this 4 channel group (Advanced)
Name: MPos'ADC board'3.Seg
Type: bdgroup
Selections for each ADC board
Default: -
Example: MPos'ADC board'3.Seg=-

Parameters added to module specific .cfg file:

Number of virtual channels (data streams) produced by this digitizer
Name: NDigitizerChannels
Type: int
Range: 1 to 6
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

Number of physical channels on this digitizer. NOTE! After changing the number of physical channels, save by pressing OK, and THEN change channel mapping or channel sensor groups.
Name: NPhysicalChannels
Type: int
Range: 1 to 60
Default: 'physical channels'
Example: NPhysicalChannels='physical channels'

Channel mapping. See Physical Channels parameter.
Name: VChxx
Type: mapping
Choices: 1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: none
Example: VChxx=mapping

FIR filter type used for all channels that are set to this sample rate
Name: FilterType1
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType1=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType10
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType10=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType20
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType20=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType50
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType50=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType100
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType100=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType200
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType200=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType250
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType250=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType500
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType500=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType1000
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType1000=acausal

FIR filter type used for all channels that are set to this sample rate
Name: FilterType2000
Type: choice
Choices: acausal,causal
Default: acausal
Example: FilterType2000=acausal

Channel sensor groups. Assigns sensor types to each group of four channels. Used to control sensor calibration and control functions. See Physical Channels parameter.
Name: Grpxx
Type: chgroup
Choices: Sensor control CSQ scripts
Default: none
Example: Grpxx=CSQ control script

Timing source for unit. Supports internal or external GPS, NTP or TOE (Time Over Ethernet). Supported external GPS is Acutime Gold.
Name: TimeSource
Type: choice
Choices: 1-TOE,2-GPS Internal,3-GPS External (<50 ft),4-GPS External (>50 ft),5-NTP
Default: 2-GPS Internal
Example: TimeSource=2-GPS Internal

This system is equipped with an internal EpiSensor deck on channels 1-3 (Dynamic Parameter)
Name: InternalDeck
Type: boolean
Default: false
Example: InternalDeck=false

Sample rate to use for output of a DFS data stream from the first four channels. Unit must be equipped with a DFS option board and this sample rate must be selected on at least one channel of channels 1-4 in order to get any DFS output.
Name: DFS
Type: choice
Choices: OFF,1sps,10sps,20sps,50sps,100sps
Default: OFF
Example: DFS=OFF

DFS mode. 1=Standard DFS mode, Maximum 4 16 bit channels up to 100sps at 19200 baud. 2=Extended DFS mode, Maximum 3 24 bit channels up to 100sps at 19200 baud.
Name: ModeDFS
Type: choice
Choices: 1-DFS Std,2-DFS Ext
Default: 1-DFS Std
Example: ModeDFS=1-DFS Std

Alarm duration (sec) before auto-reset. If zero, then latched and doesn't auto-reset. Note: Rock Alarm outputs are provided through the RockGPIO module, which must be included in the layout. (Dynamic Parameter)
Name: Duration
Type: int
Range: 0 to 7200
Default: 0
Example: Duration=0

Record temperature stream as .deg
Name: Temperature
Type: boolean
Default: true
Example: Temperature=true

Record humidity stream as .hum
Name: Humidity
Type: boolean
Default: true
Example: Humidity=true

Record VofV12Batt stream as .vvb
Name: VofV12Batt
Type: boolean
Default: true
Example: VofV12Batt=true

Record system voltage stream as .vep
Name: VofSysPwr
Type: boolean
Default: true
Example: VofSysPwr=true

Record system current stream as .vec
Name: IofSysPwr
Type: boolean
Default: true
Example: IofSysPwr=true

Record time quality stream as .lcq
Name: TimeQual
Type: boolean
Default: true
Example: TimeQual=true

Record clock phase stream as .lce
Name: TCXODrift
Type: boolean
Default: true
Example: TCXODrift=true

Record CPU Load Average stream as .cpu (values < ~200 indicate sufficient idle time)
Name: LoadAverage
Type: boolean
Default: true
Example: LoadAverage=true

Record Percent of Data Storage Used stream as .dsk
Name: PercentUsed
Type: boolean
Default: false
Example: PercentUsed=false

Record mass position stream as .um#1
Name: MassPos1
Type: boolean
Default: false
Example: MassPos1=false

Record mass position stream as .um#2
Name: MassPos2
Type: boolean
Default: false
Example: MassPos2=false

Record mass position stream as .um#3
Name: MassPos3
Type: boolean
Default: false
Example: MassPos3=false

Record RAM Used stream as .mem (Advanced)
Name: RAMUsed
Type: boolean
Default: false
Example: RAMUsed=false

Record TCXO DAC stream as .vco (Advanced)
Name: TCXODAC
Type: boolean
Default: false
Example: TCXODAC=false

Record user status stream as .usr. See the ROCK Console command 'userstat'. (Advanced)
Name: UserStat
Type: boolean
Default: false
Example: UserStat=false

Maximum sample rate supported by this system. NOTE! Increasing the maximum sampling rate should be done carefully to avoid producing more data than the system can process. After changing the maximum sampling rate, save by pressing OK, and THEN change channel mapping. (Advanced)
Name: MaxSampleRate
Type: int
Range: 50 to 2000
Default: 200
Example: MaxSampleRate=200

ADC gain (for special use only - will reduce effective dynamic range) (Advanced)
Name: Gain
Type: int
Range: 1 to 16
Default: 1
Example: Gain=1

Effective Number of Bits. Can be used to reduce the number of significant gits in recorded data. For example, ENOBS=12 effectively masks the samples with 0xFFFFF000. Scale factors are unaffected. (Advanced)
Name: ENOBS
Type: int
Range: 8 to 24
Default: 24
Example: ENOBS=24

Resync the main CPU (Linux) clock if time varies from GPS time more than this amount, in seconds (Advanced)
Name: NeedsResync
Type: int
Range: 5 to 200
Default: 30
Example: NeedsResync=30

Resync the main CPU (Linux) clock if time varies from GPS time more than this amount, in seconds. Then reboot. (Advanced)
Name: NeedsSyncAndReboot
Type: int
Range: 60 to 14400
Default: 240
Example: NeedsSyncAndReboot=240

UTC Offset value in hours. Affects timestamps of data streams, recorded files, and most displays and commands. Some time values originating from GPS will not be compensated. Daylight Savings is not used because that would produce gaps in the data stream, so for example you will get PST, but not PDT (unless you change it manually). Linux time is not changed. MUST be used in conjunction with the timezone string. (Advanced)
Name: UTCOffset
Type: double
Range: -24 to 24
Default: 0
Example: UTCOffset=0

Timezone string, e.g. PDT. Will be used to label any time values converted to local time. See UTC Offset description for more details. MUST be used in conjunction with the UTC Offset. (Advanced)
Name: TZString
Type: String
Range: 0 to 8 characters
Default: none
Example: TZString=string

MZD24 Data Interface

Module name: MZD24FrontEnd

This module is a Metrozet MZD24 digitizer front end. This module is used in Metrozet digitizers such as the iCOBI and iDAS.

The MZD24 front end interfaces with the TSA digitizer's data acquisition hardware via a special RS-485 connection in order to produce a data stream which can be further processed by the included Rockhound software installed on central processor to allow event recording, continuous recording, or telemetry.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files.
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.01 to 40
Default: 5.0
Example: 'digitizer'.ch'chan'.FullScale=5.0

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 1
Example: 'digitizer'.ch'chan'.SensorType=1

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Maximum retry request buffer time, in seconds. See Recovery Limit in the front end configuration.
Name: RetrySeconds
Type: int
Range: 1 to 1209600
Default: 1800
Example: RetrySeconds=1800

Channel ID string for the deg SOH channel (if not set, uses default name) (Advanced)
Name: Temperature.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.Id=string

Channel ID string for the hum SOH channel (if not set, uses default name) (Advanced)
Name: Humidity.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.Id=string

Channel ID string for the vvb SOH channel (if not set, uses default name) (Advanced)
Name: VofV12Batt.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.Id=string

Channel ID string for the vep SOH channel (if not set, uses default name) (Advanced)
Name: VofSysPwr.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.Id=string

Channel ID string for the vec SOH channel (if not set, uses default name) (Advanced)
Name: IofSysPwr.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.Id=string

Channel ID string for the lcq SOH channel (if not set, uses default name) (Advanced)
Name: TimeQual.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.Id=string

Channel ID string for the cpu SOH channel (if not set, uses default name) (Advanced)
Name: LoadAverage.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.Id=string

Channel ID string for the dsk SOH channel (if not set, uses default name) (Advanced)
Name: PercentUsed.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.Id=string

Channel ID string for the usr SOH channel (if not set, uses default name) (Advanced)
Name: UserStat.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.Id=string

Location Code for the deg SOH channel (Advanced)
Name: Temperature.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.Loc=string

Location Code for the hum SOH channel (Advanced)
Name: Humidity.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.Loc=string

Location Code for the vvb SOH channel (Advanced)
Name: VofV12Batt.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.Loc=string

Location Code for the vep SOH channel (Advanced)
Name: VofSysPwr.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.Loc=string

Location Code for the vec SOH channel (Advanced)
Name: IofSysPwr.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.Loc=string

Location Code for the lcq SOH channel (Advanced)
Name: TimeQual.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.Loc=string

Location Code for the cpu SOH channel (Advanced)
Name: LoadAverage.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.Loc=string

Location Code for the dsk SOH channel (Advanced)
Name: PercentUsed.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.Loc=string

Location Code for the usr SOH channel (Advanced)
Name: UserStat.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.Loc=string

Network Code for the deg SOH channel (Advanced)
Name: Temperature.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.NwId=string

Network Code for the hum SOH channel (Advanced)
Name: Humidity.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.NwId=string

Network Code for the vvb SOH channel (Advanced)
Name: VofV12Batt.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.NwId=string

Network Code for the vep SOH channel (Advanced)
Name: VofSysPwr.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.NwId=string

Network Code for the vec SOH channel (Advanced)
Name: IofSysPwr.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.NwId=string

Network Code for the lcq SOH channel (Advanced)
Name: TimeQual.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.NwId=string

Network Code for the cpu SOH channel (Advanced)
Name: LoadAverage.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.NwId=string

Network Code for the dsk SOH channel (Advanced)
Name: PercentUsed.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.NwId=string

Network Code for the usr SOH channel (Advanced)
Name: UserStat.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.NwId=string

Station Code for the deg SOH channel (Advanced)
Name: Temperature.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: Temperature.StnId=string

Station Code for the hum SOH channel (Advanced)
Name: Humidity.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: Humidity.StnId=string

Station Code for the vvb SOH channel (Advanced)
Name: VofV12Batt.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofV12Batt.StnId=string

Station Code for the vep SOH channel (Advanced)
Name: VofSysPwr.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.StnId=string

Station Code for the vec SOH channel (Advanced)
Name: IofSysPwr.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: IofSysPwr.StnId=string

Station Code for the lcq SOH channel (Advanced)
Name: TimeQual.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.StnId=string

Station Code for the cpu SOH channel (Advanced)
Name: LoadAverage.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.StnId=string

Station Code for the dsk SOH channel (Advanced)
Name: PercentUsed.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.StnId=string

Station Code for the usr SOH channel (Advanced)
Name: UserStat.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.StnId=string

Calib value for the deg SOH channel (Advanced)
Name: Temperature.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: Temperature.Calib=0.0

Calib value for the hum SOH channel (Advanced)
Name: Humidity.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: Humidity.Calib=0.0

Calib value for the vvb SOH channel (Advanced)
Name: VofV12Batt.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: VofV12Batt.Calib=0.0

Calib value for the vep SOH channel (Advanced)
Name: VofSysPwr.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: VofSysPwr.Calib=0.0

Calib value for the vec SOH channel (Advanced)
Name: IofSysPwr.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: IofSysPwr.Calib=0.0

Calib value for the lcq SOH channel (Advanced)
Name: TimeQual.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: TimeQual.Calib=0.0

Calib value for the cpu SOH channel (Advanced)
Name: LoadAverage.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: LoadAverage.Calib=0.0

Calib value for the dsk SOH channel (Advanced)
Name: PercentUsed.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: PercentUsed.Calib=0.0

Calib value for the usr SOH channel (Advanced)
Name: UserStat.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: UserStat.Calib=0.0

Calper value for the deg SOH channel (Advanced)
Name: Temperature.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: Temperature.Calper=-1.0

Calper value for the hum SOH channel (Advanced)
Name: Humidity.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: Humidity.Calper=-1.0

Calper value for the vvb SOH channel (Advanced)
Name: VofV12Batt.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: VofV12Batt.Calper=-1.0

Calper value for the vep SOH channel (Advanced)
Name: VofSysPwr.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: VofSysPwr.Calper=-1.0

Calper value for the vec SOH channel (Advanced)
Name: IofSysPwr.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: IofSysPwr.Calper=-1.0

Calper value for the lcq SOH channel (Advanced)
Name: TimeQual.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: TimeQual.Calper=-1.0

Calper value for the cpu SOH channel (Advanced)
Name: LoadAverage.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: LoadAverage.Calper=-1.0

Calper value for the dsk SOH channel (Advanced)
Name: PercentUsed.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: PercentUsed.Calper=-1.0

Calper value for the usr SOH channel (Advanced)
Name: UserStat.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: UserStat.Calper=-1.0

Segment Type for the deg SOH channel (Advanced)
Name: Temperature.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: Temperature.Seg=-

Segment Type for the hum SOH channel (Advanced)
Name: Humidity.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: Humidity.Seg=-

Segment Type for the vvb SOH channel (Advanced)
Name: VofV12Batt.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: VofV12Batt.Seg=-

Segment Type for the vep SOH channel (Advanced)
Name: VofSysPwr.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: VofSysPwr.Seg=-

Segment Type for the vec SOH channel (Advanced)
Name: IofSysPwr.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: IofSysPwr.Seg=-

Segment Type for the lcq SOH channel (Advanced)
Name: TimeQual.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: TimeQual.Seg=-

Segment Type for the cpu SOH channel (Advanced)
Name: LoadAverage.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: LoadAverage.Seg=-

Segment Type for the dsk SOH channel (Advanced)
Name: PercentUsed.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: PercentUsed.Seg=-

Segment Type for the usr SOH channel (Advanced)
Name: UserStat.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: UserStat.Seg=-

Parameters added to module specific .cfg file:

Number of virtual channels (data streams) produced by this digitizer
Name: NDigitizerChannels
Type: int
Range: 1 to 24
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

Number of physical channels on this digitizer
Name: NPhysicalChannels
Type: int
Range: 1 to 24
Default: 'physical channels'
Example: NPhysicalChannels='physical channels'

Sample rate for all channels
Name: SPS
Type: choice
Choices: 50,100,200,250
Default: 100
Example: SPS=100

Digitizer order specified as a comma separated list of serial numbers. If blank or wrong, digitizers will be sorted by serial number on each connection
Name: DigitizerOrder
Type: String
Range: 0 to 80 characters
Default: none
Example: DigitizerOrder=string

Digitizer gain for all channels
Name: Gain
Type: int
Range: 1 to 16
Default: 1
Example: Gain=1

Space-separated list of RS-485 ports. e.g. /dev/ttyS3 /dev/ttyS4
Name: RS485Ports
Type: String
Range: 1 to 80 characters
Default: /dev/ttyS3
Example: RS485Ports=/dev/ttyS3

GPS port used. e.g. /dev/ttyS5. Blank if no GPS
Name: GPSPort
Type: String
Range: 0 to 80 characters
Default: none
Example: GPSPort=string

GPS distance selection. Supports external GPS. Supported external GPS is Acutime Gold. Distance selection < 50ft uses less power, selection > 50ft allows longer distance.
Name: GPSDist
Type: choice
Choices: 1-GPS External (<50 ft),2-GPS External (>50 ft)
Default: 2-GPS External (>50 ft)l
Example: GPSDist=2-GPS External (>50 ft)l

Alarm duration (sec) before auto-reset. If zero, then latched and doesn't auto-reset. Note: Rock Alarm outputs are provided through the RockGPIO module, which must be included in the layout. (Dynamic Parameter)
Name: Duration
Type: int
Range: 0 to 7200
Default: 0
Example: Duration=0

Record temperature stream as .deg
Name: Temperature
Type: boolean
Default: true
Example: Temperature=true

Record humidity stream as .hum
Name: Humidity
Type: boolean
Default: true
Example: Humidity=true

Record VofV12Batt stream as .vvb
Name: VofV12Batt
Type: boolean
Default: true
Example: VofV12Batt=true

Record system voltage stream as .vep
Name: VofSysPwr
Type: boolean
Default: true
Example: VofSysPwr=true

Record system current stream as .vec
Name: IofSysPwr
Type: boolean
Default: true
Example: IofSysPwr=true

Record time quality stream as .lcq
Name: TimeQual
Type: boolean
Default: true
Example: TimeQual=true

Record CPU Load Average stream as .cpu (values < ~200 indicate sufficient idle time)
Name: LoadAverage
Type: boolean
Default: true
Example: LoadAverage=true

Record Percent of Data Storage Used stream as .dsk
Name: PercentUsed
Type: boolean
Default: false
Example: PercentUsed=false

Record user status stream as .usr. See the ROCK Console command 'userstat'. (Advanced)
Name: UserStat
Type: boolean
Default: false
Example: UserStat=false

Maximum sample rate supported by this system. NOTE! Increasing the maximum sampling rate should be done carefully to avoid producing more data than the system can process. After changing the maximum sampling rate, save by pressing OK, and THEN change channel mapping. (Advanced)
Name: MaxSampleRate
Type: int
Range: 50 to 2000
Default: 250
Example: MaxSampleRate=250

Type of TSA digitizer. iCOBI, iDAS or iSMA1 (Advanced)
Name: TSATYPE
Type: choice
Choices: iCOBI
Default: iCOBI
Example: TSATYPE=iCOBI

UTC Offset value in hours. Affects timestamps of data streams, recorded files, and most displays and commands. Some time values originating from GPS will not be compensated. Daylight Savings is not used because that would produce gaps in the data stream, so for example you will get PST, but not PDT (unless you change it manually). Linux time is not changed. MUST be used in conjunction with the timezone string. (Advanced)
Name: UTCOffset
Type: double
Range: -24 to 24
Default: 0
Example: UTCOffset=0

Timezone string, e.g. PDT. Will be used to label any time values converted to local time. See UTC Offset description for more details. MUST be used in conjunction with the UTC Offset. (Advanced)
Name: TZString
Type: String
Range: 0 to 8 characters
Default: none
Example: TZString=string

TSASMA Data Interface

Module name: TSASMAFrontEnd

This module is a Metrozet TSASMA digitizer front end. This module is used in the Metrozet TSASMA digitizer.

The TSASMA front end interfaces directly with the TSA digitizer's data acquisition hardware via an internal connection in order to produce a data stream which can be further processed by the included Rockhound software installed on central processor to allow event recording, continuous recording, or telemetry.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files.
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.01 to 40
Default: 5.0
Example: 'digitizer'.ch'chan'.FullScale=5.0

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 1
Example: 'digitizer'.ch'chan'.SensorType=1

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Maximum retry request buffer time, in seconds. See Recovery Limit in the front end configuration.
Name: RetrySeconds
Type: int
Range: 1 to 1209600
Default: 1800
Example: RetrySeconds=1800

Channel ID string for the vep SOH channel (if not set, uses default name) (Advanced)
Name: VofSysPwr.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.Id=string

Channel ID string for the lcq SOH channel (if not set, uses default name) (Advanced)
Name: TimeQual.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.Id=string

Channel ID string for the cpu SOH channel (if not set, uses default name) (Advanced)
Name: LoadAverage.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.Id=string

Channel ID string for the dsk SOH channel (if not set, uses default name) (Advanced)
Name: PercentUsed.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.Id=string

Channel ID string for the usr SOH channel (if not set, uses default name) (Advanced)
Name: UserStat.Id
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.Id=string

Location Code for the vep SOH channel (Advanced)
Name: VofSysPwr.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.Loc=string

Location Code for the lcq SOH channel (Advanced)
Name: TimeQual.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.Loc=string

Location Code for the cpu SOH channel (Advanced)
Name: LoadAverage.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.Loc=string

Location Code for the dsk SOH channel (Advanced)
Name: PercentUsed.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.Loc=string

Location Code for the usr SOH channel (Advanced)
Name: UserStat.Loc
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.Loc=string

Network Code for the vep SOH channel (Advanced)
Name: VofSysPwr.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.NwId=string

Network Code for the lcq SOH channel (Advanced)
Name: TimeQual.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.NwId=string

Network Code for the cpu SOH channel (Advanced)
Name: LoadAverage.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.NwId=string

Network Code for the dsk SOH channel (Advanced)
Name: PercentUsed.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.NwId=string

Network Code for the usr SOH channel (Advanced)
Name: UserStat.NwId
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.NwId=string

Station Code for the vep SOH channel (Advanced)
Name: VofSysPwr.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: VofSysPwr.StnId=string

Station Code for the lcq SOH channel (Advanced)
Name: TimeQual.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: TimeQual.StnId=string

Station Code for the cpu SOH channel (Advanced)
Name: LoadAverage.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: LoadAverage.StnId=string

Station Code for the dsk SOH channel (Advanced)
Name: PercentUsed.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: PercentUsed.StnId=string

Station Code for the usr SOH channel (Advanced)
Name: UserStat.StnId
Type: String
Range: 0 to 80 characters
Default: none
Example: UserStat.StnId=string

Calib value for the vep SOH channel (Advanced)
Name: VofSysPwr.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: VofSysPwr.Calib=0.0

Calib value for the lcq SOH channel (Advanced)
Name: TimeQual.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: TimeQual.Calib=0.0

Calib value for the cpu SOH channel (Advanced)
Name: LoadAverage.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: LoadAverage.Calib=0.0

Calib value for the dsk SOH channel (Advanced)
Name: PercentUsed.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: PercentUsed.Calib=0.0

Calib value for the usr SOH channel (Advanced)
Name: UserStat.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: UserStat.Calib=0.0

Calper value for the vep SOH channel (Advanced)
Name: VofSysPwr.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: VofSysPwr.Calper=-1.0

Calper value for the lcq SOH channel (Advanced)
Name: TimeQual.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: TimeQual.Calper=-1.0

Calper value for the cpu SOH channel (Advanced)
Name: LoadAverage.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: LoadAverage.Calper=-1.0

Calper value for the dsk SOH channel (Advanced)
Name: PercentUsed.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: PercentUsed.Calper=-1.0

Calper value for the usr SOH channel (Advanced)
Name: UserStat.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: UserStat.Calper=-1.0

Segment Type for the vep SOH channel (Advanced)
Name: VofSysPwr.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: VofSysPwr.Seg=-

Segment Type for the lcq SOH channel (Advanced)
Name: TimeQual.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: TimeQual.Seg=-

Segment Type for the cpu SOH channel (Advanced)
Name: LoadAverage.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: LoadAverage.Seg=-

Segment Type for the dsk SOH channel (Advanced)
Name: PercentUsed.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: PercentUsed.Seg=-

Segment Type for the usr SOH channel (Advanced)
Name: UserStat.Seg
Type: String
Range: 0 to 80 characters
Default: -
Example: UserStat.Seg=-

Parameters added to module specific .cfg file:

Number of virtual channels (data streams) produced by this digitizer
Name: NDigitizerChannels
Type: int
Range: 3 to 3
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

Number of physical channels on this digitizer
Name: NPhysicalChannels
Type: int
Range: 3 to 3
Default: 'physical channels'
Example: NPhysicalChannels='physical channels'

Sample rate for all channels
Name: SPS
Type: choice
Choices: 50,100,200,250,500
Default: 100
Example: SPS=100

GPS distance selection. Supports external GPS. Supported external GPS is Acutime Gold. Distance selection < 50ft uses less power, selection > 50ft allows longer distance.
Name: GPSDist
Type: choice
Choices: 1-GPS External (<50 ft),2-GPS External (>50 ft)
Default: 2-GPS External (>50 ft)
Example: GPSDist=2-GPS External (>50 ft)

Alarm duration (sec) before auto-reset. If zero, then latched and doesn't auto-reset. Note: Rock Alarm outputs are provided through the RockGPIO module, which must be included in the layout. (Dynamic Parameter)
Name: Duration
Type: int
Range: 0 to 7200
Default: 0
Example: Duration=0

Data organization for USB data retrieval. Creates a subdirectory for each unit's data, which can be by host-sn, host-UnitID, host-DigitizerID, or just by host ID
Name: USBOrg
Type: choice
Choices: BYSN,BYUNITID,BYDIGID,BYHOST
Default: BYSN
Example: USBOrg=BYSN

Record system voltage stream as .vep
Name: VofSysPwr
Type: boolean
Default: true
Example: VofSysPwr=true

Record time quality stream as .lcq
Name: TimeQual
Type: boolean
Default: true
Example: TimeQual=true

Record CPU Load Average stream as .cpu (values < ~200 indicate sufficient idle time)
Name: LoadAverage
Type: boolean
Default: true
Example: LoadAverage=true

Record Percent of Data Storage Used stream as .dsk
Name: PercentUsed
Type: boolean
Default: false
Example: PercentUsed=false

Record user status stream as .usr. See the ROCK Console command 'userstat'. (Advanced)
Name: UserStat
Type: boolean
Default: false
Example: UserStat=false

Digitizer gain for all channels (Advanced)
Name: Gain
Type: int
Range: 1 to 16
Default: 1
Example: Gain=1

Type of TSA digitizer. TSASMA (Advanced)
Name: TSATYPE
Type: choice
Choices: TSASMA
Default: TSASMA
Example: TSATYPE=TSASMA

UTC Offset value in hours. Affects timestamps of data streams, recorded files, and most displays and commands. Some time values originating from GPS will not be compensated. Daylight Savings is not used because that would produce gaps in the data stream, so for example you will get PST, but not PDT (unless you change it manually). Linux time is not changed. MUST be used in conjunction with the timezone string. (Advanced)
Name: UTCOffset
Type: double
Range: -24 to 24
Default: 0
Example: UTCOffset=0

Timezone string, e.g. PDT. Will be used to label any time values converted to local time. See UTC Offset description for more details. MUST be used in conjunction with the UTC Offset. (Advanced)
Name: TZString
Type: String
Range: 0 to 8 characters
Default: none
Example: TZString=string

Ring Buffer Data Interface

Module name: RBFrontEnd

This module is a ring buffer front end. This module is used to obtain data from an external ring buffer and is most often used to extract data from another system which is acting as a data buffer.

One example of this would be using this module in a Rockhound layout at a data center to extract data from one or more field computers (such as Slates) that are more directly connected to the digitizers and are acting as in-field buffers.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Host address of the Ring Buffer Server
Name: 'digitizer'.RBServer
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.RBServer=string

TCP Port number for the Ring Buffer Server connection, should be greater than 2000
Name: 'digitizer'.Port
Type: int
Range: 2000 to 65535
Default: 9500
Example: 'digitizer'.Port=9500

Channel source as defined in the Ring Buffer that is providing the data, e.g.: KMI_dig1_C1 or KMI_dig1_C2. True Antelope ORBs require full specification such as KMI_DIG1_HHE/GENC.
Name: 'digitizer'.ch'chan'.Source
Type: String
Range: 0 to 512 characters
Default: none
Example: 'digitizer'.ch'chan'.Source=string

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.001 to 10000.0
Default: 2.5
Example: 'digitizer'.ch'chan'.FullScale=2.5

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 32
Example: 'digitizer'.ch'chan'.SensorType=32

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Gain value for the channel - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Gain
Type: int
Range: 1 to 5000
Default: 1
Example: 'digitizer'.ch'chan'.Gain=1

EpiSensor gain value, should be set to match the sensor's jumper settings (1=2.5V range, 2=5.0V, 4=10V, 8=20V)
Name: 'digitizer'.ch'chan'.EpiGain
Type: choice
Choices: 1,2,4,8
Default: 2
Example: 'digitizer'.ch'chan'.EpiGain=2

EpiSensor range code, where 1=4g, 2=2g, ... 5=0.25g - should be set to match the sensor's jumper settings
Name: 'digitizer'.ch'chan'.EpiRange
Type: choice
Choices: 1,2,3,4,5
Default: 1
Example: 'digitizer'.ch'chan'.EpiRange=1

EpiSensor Cal Coil value in g/V. This is a factory calibrated value
Name: 'digitizer'.ch'chan'.EpiCalCoil
Type: double
Range: 0.05 to 0.10
Default: 0.05
Example: 'digitizer'.ch'chan'.EpiCalCoil=0.05

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Parameters added to module specific .cfg file:

Number of sources (channels) to be acquired from the Ring Buffer
Name: NDigitizerChannels
Type: int
Range: 1 to 36
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

Sample rate used to fill channels that never report. Notes: If a channel later reports, data fill have the correct sample rate. If 1sps used as fill sample rate, channel will not be recorded in EVT format which requires a minimum 10sps.
Name: ZeroFillRate
Type: int
Range: 1 to 2000
Default: 1
Example: ZeroFillRate=1

Flush Ring Buffer packet buffer on connect - Ring Buffer is unaffected, but this connection begins with current data
Name: FlushOnConnect
Type: boolean
Default: true
Example: FlushOnConnect=true

Writes allowed to the remote unit's Ring Buffer. Must be enabled here and in remote system (needed in order to perform remote sensor calibrations, etc.)
Name: RemoteWrites
Type: boolean
Default: false
Example: RemoteWrites=false

SOH data republished. SOH data that arrives in the PF packet is republished as dig.rbdig.LocalTemperature.
Name: Republish
Type: boolean
Default: false
Example: Republish=false

Pseudo Data Waveform Generator (Advanced)

The PseudoSampleGenerator is used to generate pseudo data to be fed through a Rockhound system. This module can be useful in software development when no real data source (e.g. a digitizer) is available.

The most common uses of the pseudo sample generator are to generate sine waves, random data, or to feed canned data from a file through the system. Although several parameters affect the behavior of the generated data such as frequency, peak, and offset, the primary behavior is controlled by the Mode parameter.

Category: CHANNELDATASOURCE
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

User settable name of the digitizer that is generating this test data
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.001 to 10000.0
Default: 2.5
Example: 'digitizer'.ch'chan'.FullScale=2.5

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 32
Example: 'digitizer'.ch'chan'.SensorType=32

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Gain value for the channel - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Gain
Type: int
Range: 1 to 5000
Default: 1
Example: 'digitizer'.ch'chan'.Gain=1

EpiSensor gain value, should be set to match the sensor's jumper settings (1=2.5V range, 2=5.0V, 4=10V, 8=20V)
Name: 'digitizer'.ch'chan'.EpiGain
Type: choice
Choices: 1,2,4,8
Default: 2
Example: 'digitizer'.ch'chan'.EpiGain=2

EpiSensor range code, where 1=4g, 2=2g, ... 5=0.25g - should be set to match the sensor's jumper settings
Name: 'digitizer'.ch'chan'.EpiRange
Type: choice
Choices: 1,2,3,4,5
Default: 1
Example: 'digitizer'.ch'chan'.EpiRange=1

EpiSensor Cal Coil value in g/V. This is a factory calibrated value
Name: 'digitizer'.ch'chan'.EpiCalCoil
Type: double
Range: 0.05 to 0.10
Default: 0.05
Example: 'digitizer'.ch'chan'.EpiCalCoil=0.05

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Parameters added to module specific .cfg file:

Sampling rate, in SPS
Name: SPS
Type: int
Range: 1 to 2000
Default: 100
Example: SPS=100

Number of channels produced by this digitizer
Name: NDigitizerChannels
Type: int
Range: 1 to 36
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

0=Sine, 1=Random, 2=From file (specify name)
Name: Mode
Type: choice
Choices: 0 - Sine,1 - Random,2 - From file
Default: 1 - Random
Example: Mode=1 - Random

Largest value generated by random or sinewaves, in counts
Name: Peak
Type: int
Range: 1 to 40000000
Default: 40000
Example: Peak=40000

Full filename path to data file. Files are multiplexed multicolumn ASCII (in counts). Lines starting with ';' are ignored. There MUST be at least as many data columns as channels.
Name: InputData
Type: String
Range: 0 to 256 characters
Default: none
Example: InputData=string

Frequency in sine mode, in Hz
Name: FreqHz
Type: double
Range: 0.001 to 1000
Default: 1
Example: FreqHz=1

Data offset, in counts
Name: Offset
Type: int
Range: -40000000 to 40000000
Default: 0
Example: Offset=0

Data multichannel integrator

Category: DATAINTEGRATOR

The DATAINTEGRATOR is used to gather data from one or more digitizers together to ensure integrity and completeness, so that all data is present and time aligned before passing on to the rest of the Rockhound system for processing.

In addition to gathering the data from all channels and all digitizers, the DATAINTEGRATOR also provides the buffering needed to provide pre-event and post-event memory and will reply to past data requests for recording purposes.

Data Integrator

Category: DATAINTEGRATOR
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELTRGFILTER_Output
and/or CHANNELDATASTREAMFILTER_Output
and/or CHANNELOASISBRIDGE_Output
and/or RECORDER_Request

Parameters added to module specific .cfg file:

Data handling plug-in layout specifier, usually used to provide for data filtering that is applied before data enters the data stream. (Advanced)
Name: InputPluginLayout
Type: choice
Choices: 'plug-in layouts list'
Default: NONE
Example: InputPluginLayout=NONE

Minimum data latency before Data Integrator will give up, publish zeros, and move on. When using multiple sample rates on seismic channels (e.g.: 1sps and 200sps) it is recommended that this be increased to minimize time alignment overhead processing. (Advanced)
Name: MinLatencySec
Type: int
Range: 1 to 300
Default: 1
Example: MinLatencySec=1

Maximum data latency before Data Integrator will give up, publish zeros, and move on (Advanced)
Name: MaxLatencySec
Type: int
Range: 10 to 300
Default: 180
Example: MaxLatencySec=180

Size of data buffer (defaults to pre-event + 10 seconds) (Advanced)
Name: MaxSecondsQueued
Type: String
Range: 0 to 8 characters
Default: none
Example: MaxSecondsQueued=string

How often to display gap fill messages, in minutes. Defaults to 0 meaning all messages displayed (Advanced)
Name: GapMessageFreq
Type: int
Range: 0 to 480
Default: 0
Example: GapMessageFreq=0

Fill unrecoverable gaps in the data with a Value. Defaults to false. If false, will fill gaps with last known value. (Advanced)
Name: GapFillWithValue
Type: boolean
Default: false
Example: GapFillWithValue=false

Value used to fill unrecoverable gaps in the data. Only used if gap fill with value selected. Defaults to zero. (Advanced)
Name: GapFillValue
Type: int
Range: -20000000 to 20000000
Default: 0
Example: GapFillValue=0

Status integrator

Category: STATUSINTEGRATOR

The STATUSINTEGRATOR is used to gather status from one or more digitizers for inclusion into the run time parameters and for eventual inclusion into statistics or recorded data.

Digitizers are expected to publish status information periodically to the data stream. This status information will be ignored by the majority of the data stream processing modules, but will be extracted and stored by the STATUSINTEGRATOR for later use.

Status Integrator

Category: STATUSINTEGRATOR
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or CHANNELOASISBRIDGE_Output
and/or RECORDER_Request

Channel extractor

Category: CHANNELEXTRACTOR

The CHANNELEXTRACTOR is used to separate the data of one channel from one digitizer from the Rockhound data stream so that it may be processed independently of other channels.

Typically, this is done by extracting individual channels from the output of the DATAINTEGRATOR so that trigger filtering and triggering may be performed, but the CHANNELEXTRACTOR may be used to divide the data stream for other purposes.

Channel Extractor

Category: CHANNELEXTRACTOR
Publishes: Output
Subscribes to: DATAINTEGRATOR_Output

Channel trigger filter

Category: CHANNELTRGFILTER

The CHANNELTRGFILTER is used to filter the data stream from a single channel with a band limiting filter before sending it to a trigger module for trigger sensing. In virtually all cases the trigger filtered data is not recorded, however there is nothing to prevent the user from recording the trigger filtered data if that is desired.

There are several trigger filters available for the user to choose from, each with their own unique characteristics.

Classic Strong Motion Filter

This module implements a Classic Strong Motion filter as used in the Altus platforms. This filter is a comb filter, which is coded using direct hard coded approaches, not one using coefficients.

The classic strong motion filter at a sampling rate of 200 Hz or 250 Hz is used in typical strong motion applications.

The low-frequency corner of a classic strong motion filter at a sampling rate of 100 Hz can be used for far-regional and tele-seismic applications. It has good protection against 20 - 40 Hz man-made seismic noise in urban areas.

The classic strong motion filter at a 250 Hz sampling rate can record for short periods with a short-period seismometer. In this case, the sensor itself protects against ~0.3 Hz marine seismic noise.

The approximate bandpass of the classic strong motion filter is:

Sampling rate	Bandpass
20	~0.01 - 1.25 Hz
40	~0.02 - 2.5 Hz
50	~0.024 - 3.125 Hz
100	~0.05 - 6.25 Hz
200	~0.1 - 12.5 Hz
250	~0.12 - 15 Hz

Category: CHANNELTRGFILTER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

IIR-A Filter

This is an IIR-A filter Rockhound module. This is a 6th order Elliptical Bandpass Filter, designed for three cascaded second order sections in direct form I.

An IIR-A filter with a 100 Hz sampling rate can record regional events with broadband sensors. Its 0.6 Hz low-corner frequency gives some protection to the dominant component of natural marine seismic noise. Its high-corner frequency gives protection against excessive high-frequency man-made seismic noise.

An IIR-A filter with a sampling rate of 200 or 250 Hz can monitor local earthquakes with efficient protection against marine noise.

The approximate bandpass of the IIR-A filter is:

Sampling rate	Bandpass
20	~0.12 - 2 Hz
40	~0.24 - 4 Hz
50	~0.3 - 5 Hz
100	~0.6 - 10 Hz
200	~1.2 - 20 Hz
250	~1.5 - 25 Hz

Category: CHANNELTRGFILTER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

IIR-C Filter

This is an IIR-C filter Rockhound module. This is a 6th order Elliptical Bandpass Filter, designed for three cascaded second order sections in direct form I.

An IIR-C filter at a 200 or 250 Hz sampling rate can monitor local earthquakes. However, there is no protection against high-frequency man-made noise because the frequency content of the events and the noise is approximately the same.

The approximate bandpass of the IIR-C filter is:

Sampling rate	Bandpass
20	~0.2 - 4 Hz
40	~0.4 - 8 Hz
50	~0.5 - 10 Hz
100	~1 - 20 Hz
200	~2 - 40 Hz
250	~2.5 - 50 Hz

Category: CHANNELTRGFILTER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

LPSRO Filter (Advanced)

This is an LPSRO trigger filter Rockhound module. This is a Multi-Stage IIR filter with the following characteristics:

Descr: Simulation of long-period SRO from LP
Sample rate: 1 sps
Stage 1: cut=0.02, Butterworth, high pass
Stage 2: cut=0.04, Butterworth, low pass

This is a trigger filter often used for long period data.

Category: CHANNELTRGFILTER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

LPWWSS Filter (Advanced)

This is an LPWWSS trigger filter Rockhound module. This is a Multi-Stage IIR filter with the following characteristics:

Descr: Simulation of long-period world-wide from LP
Sample rate: 1 sps
Stage 1: cut=0.01, Butterworth, high pass
Stage 2: cut=0.066666, Butterworth, low pass

This is a wider trigger filter used for long period data.

Category: CHANNELTRGFILTER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

GS21 Filter (Advanced)

This is a GS21 trigger filter Rockhound module. This is a Multi-Stage IIR filter with the following characteristics:

Descr: Short period GS21 filter
Sample rate: 20 sps
Stage 1: cut=0.1, Butterworth, high pass
Stage 2: cut=1.333, Butterworth, low pass

This is a trigger filter often used for short period data.

Category: CHANNELTRGFILTER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

SPWWSS Filter (Advanced)

This is a SPWWSS trigger filter Rockhound module. This is a Multi-Stage IIR filter with the following characteristics:

Descr: Simulation of short-period world-wide from VBB: Gain x 10
Sample rate: 20 sps
Stage 1: cut=0.95238, Butterworth, high pass
Stage 2: cut=1.333, Butterworth, low pass

This is a narrow trigger filter used for VBB short period data.

Category: CHANNELTRGFILTER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

Channel trigger

Category: CHANNELTRIGGER

The CHANNELTRIGGER is used to perform triggering on a data stream from a single channel after it has been trigger filtered.

The result of the CHANNELTRIGGER is that outputs are published when the channel changes state from triggered to detriggered or from detriggered to triggered.

Typically, the output of a CHANNELTRIGGER is subscribed to by a VOTER.

Threshold Trigger

This module is a threshold trigger detector. It accepts a data stream from a single channel of data and monitors it against trigger and detrigger threshold values expressed as percentage of full scale.

The threshold trigger publishes every time that the trigger changes state between triggered and detriggered. This information is used by the Voter to determine when the overall system has been triggered and should begin event recording.

The trigger threshold, detrigger threshold, and the votes for this channel can be specified.

Category: CHANNELTRIGGER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELTRGFILTER_Output

Parameters added to module specific .cfg file:

Trigger threshold as a percentage of full scale, percentage (Dynamic Parameter)
Name: TriggerThreshold
Type: double
Range: 0.001 to 100.000
Default: 2.0
Example: TriggerThreshold=2.0

Detrigger threshold as a percentage of full scale, percentage (Dynamic Parameter)
Name: DetriggerThreshold
Type: double
Range: 0.001 to 100.000
Default: 2.0
Example: DetriggerThreshold=2.0

Alarm threshold as a percentage of full scale, percentage (Dynamic Parameter)
Name: AlarmThreshold
Type: double
Range: 0.001 to 100.000
Default: 2.0
Example: AlarmThreshold=2.0

Trigger votes for this channel (Dynamic Parameter)
Name: TriggerVotes
Type: int
Range: -1000 to 1000
Default: 1
Example: TriggerVotes=1

Detrigger votes for this channel (Dynamic Parameter)
Name: DetriggerVotes
Type: int
Range: -1000 to 1000
Default: 1
Example: DetriggerVotes=1

STA/LTA Trigger

This module is an STA/LTA trigger detector. It accepts a data stream from a single channel of data and monitors it to compare the Short Term Average of the data versus the Long Term Average of the data.

The STA/LTA trigger publishes every time that the trigger changes state between triggered and detriggered. This information is used by the Voter to determine when the overall system has been triggered and should begin event recording.

The STA/LTA trigger works by comparing a short term running average of the trigger filtered data with a long term average of the trigger filtered data. If the short term average exceeds the long term average by the trigger ratio the channel is considered "triggered". When the channel is triggered the LTA length increases to the maximum length of 120 seconds to prevent loss of "coda" in a long event. Also the criteria to detrigger the channel is that the STA/LTA ratio must fall below the detrigger ratio, calculated as:

```
1.0 + ((detriggerPercent * 0.01) * (triggerRatio - 1.0))
```

These techniques allow the user to set the instrument relatively easily as only one type of STA/LTA needs to be considered.

Example from default:

```
Trigger ratio: 4
Detrigger ratio: 1.0 + (0.40 * (4-1)) = 2.2
```

To set up an STA/LTA trigger, select the length of the short term average in seconds (these range from 0.1 to 10 seconds). Next select the long term average time in seconds (these range from 20 to 120 seconds). Finally, select the ratio of the STA/LTA that will cause the channel to trigger and detrigger (these range from 1.5 to 1000 for triggering and 10% to 100% for detriggering). The lower you set the trigger ratio the more sensitive the unit and the more events both real and spurious you are likely to record. The detrigger ratio will determine how sensitive the channel becomes once it has triggered. You then need to repeat this procedure for each channel that is active in the recorder's triggering scheme.

Remember that this setup causes a channel to trigger, but you will still need to set up the Voter to indicate how many channels of triggering are required to trigger the unit for recording.

The trigger ratio, detrigger percentage, STA length, LTA length, and the votes for this channel can be specified.

Category: CHANNELTRIGGER
Publishes: Output
Subscribes to: CHANNELEXTRACTOR_Output
and/or CHANNELTRGFILTER_Output

Parameters added to module specific .cfg file:

STA/LTA Trigger ratio (Dynamic Parameter)
Name: TriggerRatio
Type: choice
Choices: 1.5,2,3,4,6,8,10,20,30,40,60,100
Default: 4.0
Example: TriggerRatio=4.0

STA/LTA Detrigger percentage (Dynamic Parameter)
Name: DetriggerPercent
Type: choice
Choices: 10,15,20,40,60,100
Default: 40.0
Example: DetriggerPercent=40.0

STA duration, in seconds (Dynamic Parameter)
Name: STALength
Type: choice
Choices: 0.1,0.2,0.3,0.4,0.5,0.6,0.8,1.0,1.2,1.4,1.6,1.8,2.0,2.5,3.0,5.0,10.0
Default: 1.0
Example: STALength=1.0

LTA length, in seconds (Dynamic Parameter)
Name: LTALength
Type: choice
Choices: 20,30,40,50,60,80,100,120
Default: 60
Example: LTALength=60

Alarm threshold as a percentage of full scale, percentage (Dynamic Parameter)
Name: AlarmThreshold
Type: double
Range: 0.001 to 100.000
Default: 2.0
Example: AlarmThreshold=2.0

Trigger votes for this channel (Dynamic Parameter)
Name: TriggerVotes
Type: int
Range: -1000 to 1000
Default: 1
Example: TriggerVotes=1

Detrigger votes for this channel (Dynamic Parameter)
Name: DetriggerVotes
Type: int
Range: -1000 to 1000
Default: 1
Example: DetriggerVotes=1

Channel data filter

Category: CHANNELDATASTREAMFILTER

The DATASTREAMFILTER is used to modify the data stream from a single channel, usually by filtering and decimating the data stream. Often, this will be used to modify the effective data rate before recording - for example to convert an input data stream of 100sps to a recorded data stream of 40sps.

DIY FIR Filter (Advanced)

This module is a Do-It-Yourself (DIY) FIR filter Rockhound module. In this filter, you specify your own decimation factor AND a file that contains the coefficients. The module will figure out the rest from there, including group delays.

The file looks like this:

```
 .0000000000000000E+00
 .0000000000000000E+00
-.4768371582031250E-06
-.1668930053710937E-05
-.4172325134277344E-05
-.8821487426757812E-05
-.1704692840576172E-04
-.3015995025634766E-04
-.4982948303222656E-04
-.7760524749755859E-04
-.1145601272583008E-03
-.1610517501831055E-03
-.2157688140869141E-03
-.2758502960205078E-03
```

The file contains one coefficient per line. The number of coefficients is determined from the file. For a filter with 'n' coefficients, the file will be arranged as follows:

```
C0
C1
:
C(c-1)
C(center)=(n-1)/2
C(c+1)
:
Cn-2
Cn-1
```

Users are responsible for determining if the frequency response and stability of the resulting filter meets their requirements.

Category: CHANNELDATASTREAMFILTER
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or CHANNELEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

Decimation factor of filter
Name: DecimationFactor
Type: int
Range: 1 to 1000
Default: 10
Example: DecimationFactor=10

File to hold filter coefficients
Name: Coefficients
Type: String
Range: 1 to 128 characters
Default: .\\coefficients.txt
Example: Coefficients=.\\coefficients.txt

DIY IIR Filter (Advanced)

This is an IIR filter Rockhound module. This filter is suitable for IIR implementations realized with 4 multiplier floating point cascaded sections in form II (the incoming sample is added to the feedback loops).

The user must specify the decimation factor, group delay, settling time, and a file that contains the filter gain and coefficients.

Format of coefficient file is:

```
Gain
a(1,1)   b(1,1)
a(1,2)   b(1,2)
a(2,1)   b(2,1)
a(2,2)   b(2,2)
.        .
.        .
.        .
a(n,1)   b(n,1)
a(n,2)   b(n,2)
```

where 'a' denotes the denominator and 'b' the numerator coefficients. The filter requires an equal number of numerator and denominator coefficients.

Users are responsible for determining if the frequency response and stability of the resulting filter meets their requirements. In other words, each line of the file must have two entries.

Category: CHANNELDATASTREAMFILTER
Publishes: Output

Subscribes to: CHANNELTESTSOURCE_Output
and/or CHANNELDATASOURCE_Output
and/or CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 3000
Example: SamplesToSettle=3000

Decimation factor of filter
Name: DecimationFactor
Type: int
Range: 1 to 1000
Default: 1
Example: DecimationFactor=1

Group delay of filter, in milliseconds
Name: GroupDelay
Type: int
Range: 0 to 100000
Default: 0
Example: GroupDelay=0

File to hold filter coefficients
Name: Coefficients
Type: String
Range: 1 to 128 characters
Default: .\\coefficients.txt
Example: Coefficients=.\\coefficients.txt

Velocity IIR Filter (Advanced)

This is an IIR filter Rockhound module. This filter is used with the OASIS system to derive velocity from acceleration data. The filter coefficients can be changed, but the default values and the use of filters in OASIS is defined in the OASIS manual, p/n 300640.

Category: CHANNELDATASTREAMFILTER
Publishes: Output
Subscribes to: CHANNELTESTSOURCE_Output
and/or CHANNELDATASOURCE_Output
and/or CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 0
Example: SamplesToSettle=0

Decimation factor of filter
Name: DecimationFactor
Type: int
Range: 1 to 1000
Default: 1
Example: DecimationFactor=1

Group delay of filter, in milliseconds
Name: GroupDelay
Type: int
Range: 0 to 100000
Default: 0
Example: GroupDelay=0

File to hold filter coefficients
Name: Coefficients
Type: String
Range: 1 to 128 characters
Default: .\\velocitycoefficients.txt
Example: Coefficients=.\\velocitycoefficients.txt

Displacement IIR Filter (Advanced)

This is an IIR filter Rockhound module. This filter is used with the OASIS system to derive displacement from velocity data. The filter coefficients can be changed, but the default values and the use of filters in OASIS is defined in the OASIS manual, p/n 300640.

Category: CHANNELDATASTREAMFILTER
Publishes: Output
Subscribes to: CHANNELTESTSOURCE_Output
and/or CHANNELDATASOURCE_Output
and/or CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 0
Example: SamplesToSettle=0

Decimation factor of filter
Name: DecimationFactor
Type: int
Range: 1 to 1000
Default: 1
Example: DecimationFactor=1

Group delay of filter, in milliseconds
Name: GroupDelay
Type: int
Range: 0 to 100000
Default: 0
Example: GroupDelay=0

File to hold filter coefficients
Name: Coefficients
Type: String
Range: 1 to 128 characters
Default: .\\displacementcoefficients.txt
Example: Coefficients=.\\displacementcoefficients.txt

Post-Integration IIR Filter (Advanced)

This is an IIR filter Rockhound module. This filter is used with the OASIS system to filter velocity or displacement data after integration. The filter coefficients can be changed, but the default values and the use of filters in OASIS is defined in the OASIS manual, p/n 300640.

Category: CHANNELDATASTREAMFILTER
Publishes: Output
Subscribes to: CHANNELTESTSOURCE_Output
and/or CHANNELDATASOURCE_Output
and/or CHANNELEXTRACTOR_Output
and/or CHANNELPREEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output
and/or CHANNELOASISINTEGRATOR_Output

Parameters added to module specific .cfg file:

Filter settling time, in samples
Name: SamplesToSettle
Type: int
Range: 0 to 300000
Default: 0
Example: SamplesToSettle=0

Decimation factor of filter
Name: DecimationFactor
Type: int
Range: 1 to 1000
Default: 1
Example: DecimationFactor=1

Group delay of filter, in milliseconds
Name: GroupDelay
Type: int
Range: 0 to 100000
Default: 0
Example: GroupDelay=0

File to hold filter coefficients
Name: Coefficients
Type: String
Range: 1 to 128 characters
Default: .\\postintegrationcoefficients.txt
Example: Coefficients=.\\postintegrationcoefficients.txt

Voter

Category: VOTER

The VOTER is used to tally all votes from all contributing triggers so that a final determination can be made as to whether or not Rockhound is triggered.

Triggers received within the TriggerWindowMS time period will be evaluated together to determine the system trigger state.

Note: Trigger timestamps from multiple front ends may vary slightly due to internal timing variations, but the reported time will always be properly within the trigger window.

Voter

Category: VOTER
Publishes: Output
Subscribes to: CHANNELTRIGGER_Output

Parameters added to module specific .cfg file:

Total votes needed to trigger recording (Dynamic Parameter)
Name: VotesToTrigger
Type: int
Range: 1 to 1000
Default: 1
Example: VotesToTrigger=1

Total votes needed to detrigger recording, once triggered (Dynamic Parameter)
Name: VotesToDetrigger
Type: int
Range: 1 to 1000
Default: 1
Example: VotesToDetrigger=1

Propagation window for trigger detection, in milliseconds (Advanced) (Dynamic Parameter)
Name: TriggerWindowMS
Type: int
Range: 0 to 5000
Default: 800
Example: TriggerWindowMS=800

CGS Voter

There are two different Voters available in the system. The first is the traditional Voter used in previous generation Altus digitizers, and the other is the CGS Voter that works similarly to the standard Voter, but differs in how detriggering is done.

In either Voter, a channel is considered triggered if it has filtered data values that exceed the specified level specified for that channel. Correspondingly, a channel is considered detriggered if NO values exceed the specified level.

Note that the levels used change depending on whether the system as a whole is triggered or not. If the system is not triggered, the filtered data values are compared against the TRIGGER levels, whereas once the system has been triggered they are compared against the DETRIGGER levels.

The standard Voter counts triggers and uses that count to determine detriggering by comparing votes with the detrigger voting threshold. If the number of votes of triggered channels do not exceed the detrigger threshold, then the system will detrigger. Exceeding the detrigger threshold will cause the system to remain triggered.

With this Voter, the system detriggers when not enough channels exceed the trigger threshold (number of votes) to maintain the trigger.

The CGS Voter works differently in that it requires that each channel contribute enough detrigger votes to exceed the detrigger voting threshold. If the number of detrigger votes do not exceed the threshold, the system remains triggered. If the number of detrigger votes exceeds the detrigger threshold, then the system will detrigger.

With this Voter, the channels accumulate detrigger votes when they fall below the detrigger level. The system will detrigger when enough detrigger votes accumulate that the number of detrigger votes exceeds to votes needed to detrigger the system.

Category: VOTER
Publishes: Output
Subscribes to: CHANNELTRIGGER_Output

Parameters added to module specific .cfg file:

Total votes needed to trigger recording (Dynamic Parameter)
Name: VotesToTrigger
Type: int
Range: 1 to 1000
Default: 1
Example: VotesToTrigger=1

Total votes needed to detrigger recording, once triggered (Dynamic Parameter)
Name: VotesToDetrigger
Type: int
Range: 1 to 1000
Default: 1
Example: VotesToDetrigger=1

Propagation window for trigger detection, in milliseconds (Advanced) (Dynamic Parameter)
Name: TriggerWindowMS
Type: int
Range: 0 to 5000
Default: 800
Example: TriggerWindowMS=800

Event recorder

Category: RECORDER

The RECORDER module is used to record events based on decisions made by the VOTER. The RECORDER uses pre-event and post-event variables established by Rockhound to extract data from the DATAINTEGRATOR for recording.

Data from the RECORDER is passed to an OUTPUTFORMATTER module for storage in the desired format.

Recorder

Category: RECORDER
Publishes: Output, Request
Subscribes to: VOTER_Output
and/or OASISDRIFTTRIGGER_Output

Parameters added to smarts.cfg:

Pre-event time, in seconds
Name: PreEventSec
Type: int
Range: 0 to 500
Default: 3
Example: PreEventSec=3

Post event time, in seconds
Name: PostEventSec
Type: int
Range: 0 to 65000
Default: 10
Example: PostEventSec=10

Parameters added to module specific .cfg file:

Minimum event run time, in seconds. If set to zero, event length time is not affected by this parameter.
Name: MinRunTime
Type: int
Range: 0 to 1000
Default: 0
Example: MinRunTime=0

Clear event counter on restart. If not set, the event counter accumulates with each new event until manually cleared. If set, the event counter is cleared every time that the system restarts allowing you to use the current restart count and event count to derive the most recently recorded Altus EVT file name when using Altus file naming.
Name: AQClearEvent
Type: boolean
Default: false
Example: AQClearEvent=false

Continuous recorder

Category: CONTINUOUSRECORDER

The CONTINUOUSRECORDER is used to record data from the digitizers on a continuous basis. Typically, the CONTINUOUSRECORDER subscribes directly to the output of the DATAINTEGRATOR.

This module inserts time slice signals into the data flow every FileDurationSec seconds to cause OUTPUTFORMATTERs to close their existing file(s) and open a new file.

A second parameter FileBegins, if non-zero, indicates the starting second value for each created file. For example:

To record one minute files that start on the minute, set FileDurationSec and FileBegins to 60.

To record five minute files once per hour on the hour, set FileDurationSec to 300 and FileBegins to 3600.

Continuous Recorder

Category: CONTINUOUSRECORDER
Publishes: Output
Subscribes to: DATAINTEGRATOR_Output
and/or CHANNELDATASTREAMFILTER_Output

Parameters added to module specific .cfg file:

Time increments of recorded files, in seconds
Name: FileDurationSec
Type: int
Range: 1 to 28800
Default: 3600
Example: FileDurationSec=3600

If non-zero: Starting second value of continuously recorded files. For example, '60' will cause files to be recorded starting on the minute. Data before the start point is ignored.
Name: FileBegins
Type: int
Range: 0 to 28800
Default: 3600
Example: FileBegins=3600

File data formatter and archiver

Category: OUTPUTFORMATTER

The OUTPUTFORMATTER is used to store data in the desired format. The decision of what data to store has been made outside of the module. The OUTPUTFORMATTER is only responsible for recording it in the proper format.

Typically, an OUTPUTFORMATTER can accept data from a RECORDER or a CONTINUOUSRECORDER.

MiniSeed Format Data Archiver

A multi channel MiniSeed (MSEED) format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as multiple MiniSeed files, one per data stream.

The output filenames are constructed from a combination of the starting time of the first sample in the file, the UnitID, the channel number (relative to the digitizer), and the channel ID, as follows:

```
yyyymmddhhmmss.UnitID.chan#.chanID.m
```

One file is created for each channel that is being recorded. Time is taken from the time of the first data that is to be recorded, NChannels, UnitID and ChanID are taken from the RuntimeParams.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the archiver.

Channel IDs are taken from RuntimeParams if they are available. If not, they are loaded with simply "C#", where "#" is replaced by a numeric channel number.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created MiniSeed files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Compression method used in producing MiniSEED files (Dynamic Parameter)
Name: Compression
Type: choice
Choices: Steim1,Steim2
Default: Steim1
Example: Compression=Steim1

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

If set, causes the formatter to record only channels at the specified sample rate. This is provided as a convenience when some channels are recorded at one sample rate and sent by telemetry at a different sample rate.
Name: OnlySPS
Type: choice
Choices: Unused,1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

Cimarron style directory structure, e.g. digitizer/data/D070929/
Name: CimarronFmt
Type: boolean
Default: false
Example: CimarronFmt=false

Three character filenames forced if Cimarron style directory structures used, one char for SPS and two for channel number - SPS: 1=I, 10=X, 20=T, 40=F, 50=L, 100=C, 200=B, 250=S, 500=D, 1000=M, 2000=H. Examples at 200sps: Ch1=B01, Ch10=B10, etc. Example name would be CBID00__.C01, where 'BID' indicates Month (11), Day (18) and Hour (13). C01 is the channel identifier (channel 1 at 100sps).
Name: CimarronNames
Type: boolean
Default: true
Example: CimarronNames=true

Alternate file naming if Cimarron Format not used. '.m' files have the naming format YYYYMMDDHHMMSS.STN.CHN.CHAN.m (where STN is the dig name or channel specific station ID), for example 20100113000014.KMI.001.HHZ.m. '.seed' files have the naming format STN.NW.CHAN.LOC.YYYYMMDD_HHMMSS.seed, for example KMI.KM.HHZ.01.20100113_000014.seed
Name: AlternateNaming
Type: choice
Choices: 1 - .m files,2 - .seed files
Default: 1 - .m files
Example: AlternateNaming=1 - .m files

SAC Format Data Archiver

A multi channel SAC format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as multiple SAC files, one per data stream.

The output filenames are constructed from a combination of the starting time of the first sample in the file, the UnitID, and the channel ID, as follows:

```
yyyydddhhmmss.ssss.UnitID.chanID.sac
```

One file is created for each channel that is being recorded. Time is taken from the time of the first data that is to be recorded, NChannels, UnitID and ChanID are taken from the RuntimeParams.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the archiver.

Channel IDs are taken from RuntimeParams if they are available. If not, they are loaded with simply "C#", where "#" is replaced by a numeric channel number.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created SAC files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

If set, causes the formatter to record only channels at the specified sample rate. This is provided as a convenience when some channels are recorded at one sample rate and sent by telemetry at a different sample rate.
Name: OnlySPS
Type: choice
Choices: Unused,1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

Use SAC extensions for created files, e.g. '20030625162449.dig1.4.C4.sac', default is .Sxx extensions e.g. '.s00', '.s01', etc.
Name: SACExtension
Type: boolean
Default: false
Example: SACExtension=false

COSMOS Format Data Archiver

A multi channel COSMOS format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as multiple COSMOS files, one per data stream.

The output filenames are constructed from a combination of the starting time of the first sample in the file, the UnitID, the channel number (relative to the digitizer), and the channel ID, as follows:

```
yyyymmddhhmmss.UnitID.chan#.chanID.v0
```

A Julian day filenaming option is supported, as is giving the user limited control over the population of the output data file by modifying the COSMOS.CFG file (see the documentation on the K2COSMOS utility, 302438 for details), this includes support for creation of v1 rather than v0 files.

One file is created for each channel that is being recorded. Time is taken from the time of the first data that is to be recorded, NChannels, UnitID and ChanID are taken from the RuntimeParams.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the recorder.

Channel IDs are taken from RuntimeParams if they are available. If not, they are loaded with simply "C#", where "#" is replaced by a two digit channel number. Channel numbers above 99 will just get truncated.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created COSMOS files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

If set, causes the formatter to record only channels at the specified sample rate. This is provided as a convenience when some channels are recorded at one sample rate and sent by telemetry at a different sample rate.
Name: OnlySPS
Type: choice
Choices: Unused,1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

MATLAB Format Data Archiver

A multi channel MatLab archiver that saves events in the MatLab .m format.

The output filenames are constructed from a combination of the starting time of the first sample in the file, the network code, and the unit ID, as follows:

```
M20080318_160536_KM_KMI.m
```

Data can be stored at multiple sample rates and is stored as ADC counts only, so further processing will need to apply appropriate scaling factors to convert the data to Engineering units.

To open a generated MatLab format .m file, open the data file first, and then open a plotting or processing program such as the kmiplot.m example that is provided with the distribution.

In order to make use of the produced data files, the user will need to have a program that can read the MatLab .m data format such as MatLab itself or a compatible program.

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created text files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

SEISAN Format Data Archiver

A multi channel SEISAN format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as multichannel SEISAN v7.0 data files.

The output filename is constructed from a combination of the starting time of the first sample in the file, the Network ID, and the number of channels:

```
yyyy-mm-dd-hhmm-sss.netID_006
```

One file is typically created for all channels that are being recorded. Time is taken from the time of the first data that is to be recorded, Network ID, NChannels, and UnitID are taken from the RuntimeParams.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the recorder.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

The user is given limited control over the population of the output data file (specifically the headers) by modifying the SEISAN.CFG file. SEISAN's ASCII event headers and the channel headers are contained in this file, and can be modified either directly within the file (with great care) or can be modified using the ".set" command to set individual values.

The ".set" commands are placed at the end of the file, following this format:

```
.set varname value
```

The variables available for setting are listed here. Note that the 'x' in "C#x" is replaced with the sequential channel number within the file (e.g. 5 for "C#5":

Variable Name	Type	Line	Offset	Length
C#xGAINFAC	String	1	76	1
C#xRESPONSEINFO	String	1	78	2
C#xCOMMENT	String	2	1	80
C#xSEISMOMETERPERIOD	String	3	1	8
C#xDAMPING	String	3	9	8
C#xAMPLIFIERGAIN	String	3	25	8
C#xMEDIAGAIN	String	3	33	8
C#xGAINAT1HZ	String	3	41	8
C#xF1CUTOFF	String	3	49	8
C#xF1POLES	String	3	57	8
C#xF2CUTOFF	String	3	65	8
C#xF2POLES	String	3	73	8
C#xF3CUTOFF	String	4	1	8
C#xF3POLES	String	4	9	8
C#xF4CUTOFF	String	4	17	8
C#xF4POLES	String	4	25	8
C#xF5CUTOFF	String	4	33	8
C#xF5POLES	String	4	41	8
C#xF6CUTOFF	String	4	49	8
C#xF6POLES	String	4	57	8
C#xF7CUTOFF	String	4	65	8
C#xF8POLES	String	4	73	8
C#xRESP1 to 90	String	5 to 13	1,9,17...	8
C#xNUMBERPOLES	Integer	3	1	5
C#xNUMBERZEROS	Integer	3	6	5
C#xNORMALIZATION	String	3	12	11
C#xPNZ1 to 75	String	3 to 13	1,12,23...	11

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created SEISAN files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \seismo\
Example: OutputDir=\seismo\

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

If set, causes the formatter to record only channels at the specified sample rate. This is provided as a convenience when some channels are recorded at one sample rate and sent by telemetry at a different sample rate.
Name: OnlySPS
Type: choice
Choices: Unused,1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

Separate SEISAN file creation by digitizer name. (Dynamic Parameter)
Name: Separate
Type: boolean
Default: false
Example: Separate=false

Data is placed directly into the SEISAN database named by Output Directory. In this case, 'Directory layout' is ignored
Name: DirectToDB
Type: boolean
Default: false
Example: DirectToDB=false

SEISAN distance indicator code that is used in identifying records when placed directly into the SEISAN database
Name: DistanceIndicator
Type: String
Range: 1 to 1 characters
Default: L
Example: DistanceIndicator=L

Altus EVT Format Data Archiver

A multi channel Altus EVT format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as one or more Altus EVT compatible files.

The files report as much information as is available. For example, continuously recorded data won't have trigger times, trigger types, or trigger filters available, so that information will be loaded with nominal values. Event recorded data will have this information available, so it will be properly placed in the EVT file header.

Files are segregated to fit within the EVT format restrictions, meaning that all channels must have the same start time, sample rate, number of channels, and a maximum of 18 channels are supported per EVT file. If the available data does not fit these criteria, the data will be broken up and recorded as multiple EVT files.

The output filenames are constructed from a combination of the starting time of the first sample in the file, the digitizer and channel ID of the first recorded channel, and the UnitID as follows:

```
yyyymmddhhmmss.dig.xx.UnitID.evt
```

This naming convention covers (among other things), files which must be segregated because sample rates are different, are based on different time, or there are just too many channels to record in a single file.

Time is taken from the time of the first data that is recorded, NChannels, UnitID and ChanIDs are taken from the RuntimeParams.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the archiver.

Channel IDs are taken from RuntimeParams if they are available. If not, they are loaded with simply "C#", where "#" is replaced by a numeric channel number. It is recommended that channels from multiple front ends be identified by giving them unique channel IDs.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

Lots of additional information, such as trigger types, trigger time, trigger filters, trigger thresholds, votes, and channel information are taken from the RunTimeParameters or from the TriggerInfo that is passed from the recorder. Trigger info is saved in the header info file and retrieved at the time that the temporary files are collapsed into the actual EVT file. This is done to assure that the trigger info from multiple events get correlated properly with the correct recorded data.

A multi channel Altus EVT format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as one or more Altus EVT compatible files.

The files report as much information as is available. For example, continuously recorded data won't have trigger times, trigger types, or trigger filters available, so that information will be loaded with nominal values. Event recorded data will have this information available, so it will be properly placed in the EVT file header.

Files are segregated to fit within the EVT format restrictions, meaning that all channels must have the same start time, sample rate, number of channels, and a maximum of 18 channels are supported per EVT file. If the available data does not fit these criteria, the data will be broken up and recorded as multiple EVT files.

The output filenames are constructed from a combination of the starting time of the first sample in the file, the digitizer and channel ID of the first recorded channel, and the UnitID as follows:

```
yyyymmddhhmmss.dig.xx.UnitID.evt
```

This naming convention covers (among other things), files which must be segregated because sample rates are different, are based on different time, or there are just too many channels to record in a single file.

Time is taken from the time of the first data that is recorded, NChannels, UnitID and ChanIDs are taken from the RuntimeParams.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the archiver.

Channel IDs are taken from RuntimeParams if they are available. If not, they are loaded with simply "C#", where "#" is replaced by a numeric channel number. It is recommended that channels from multiple front ends be identified by giving them unique channel IDs.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

Lots of additional information, such as trigger types, trigger time, trigger filters, trigger thresholds, votes, and channel information are taken from the RunTimeParameters or from the TriggerInfo that is passed from the recorder. Trigger info is saved in the header info file and retrieved at the time that the temporary files are collapsed into the actual EVT file. This is done to assure that the trigger info from multiple events get correlated properly with the correct recorded data.

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created EVT files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

If set, causes the formatter to record only channels at the specified sample rate. This is provided as a convenience when some channels are recorded at one sample rate and sent by telemetry at a different sample rate.
Name: OnlySPS
Type: choice
Choices: Unused,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

Separate EVT file creation by digitizer name. If separated, the individual name and serial number of each digitizer will be used if available. If not separated, the UnitID will be used as the 'digitizer' name and the license number will be used as the serial number. (Dynamic Parameter)
Name: Separate
Type: boolean
Default: false

Example: Separate=false

When the number of channels or sample rates require that multiple output files are created for a single event, ZIP the resulting files into a single ZIP file. (Dynamic Parameter)
Name: ZipFiles
Type: boolean
Default: false
Example: ZipFiles=false

When the system ZIPs multiple output files, delete the original output files and keep only the ZIP. (Dynamic Parameter)
Name: ZipNoSource
Type: boolean
Default: false
Example: ZipNoSource=false

Text Format Data Archiver

This module is used to create simple multi-column output files when used as an OUTPUTFORMATTER with an EventRecorder or ContinuousRecorder module. Each column represents one channel of data, starting with the first channel, and each row represents one set of samples starting with the first set of samples in the file.

When a scaling factor is not used, the output of the MultiChTextSampleArchiver is in counts as received from the digitizer.

```
34652  -105064      25818
34026  -105424      25808
33634  -105092      26234
33142  -104778      26544
34742  -105014      26064
35234  -104912      26082
33036  -104962      26216
33714  -105064      26108
34124  -104972      26310
33920  -105244      26090
34748  -104998      26182
33998  -104876      26450
33628  -105064      26094
33376  -104946      26284
33670  -105076      26238
35330  -105168      26096
34372  -105152      26384
33136  -105032      26110
33640  -104846      26226
33380  -104900      26124
34918  -105060      25798
35234  -104918      26530
33400  -105122      26512
33208  -105366      25884
33100  -104954      25926
34678  -104872      26026
35832  -104840      26532
33626  -104954      26492
32540  -105130      25724
33848  -105126      26202
```

Note that this module is normally only used by Kinemetrics for testing, but it may be of use to some customers who do not wish to deal with the complexities of "standard" output formats.

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created text files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'. NOTE!! If you choose to specify channels, ALL SPECIFIED channels must be present in order to record data. Otherwise you will get empty files! Specifying '*' here will record all reporting channels.
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

Include sample time as first column of data. Time format is sss.mmm where sss is seconds since midnight January 1, 1970 (GMT), and mmm is the millisecond within the second. (Dynamic Parameter)
Name: TimeColumn
Type: boolean
Default: false
Example: TimeColumn=false

Generate unique filenames when creating new files
Name: UniqueFilenames
Type: boolean
Default: true
Example: UniqueFilenames=true

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

Include digitizer name in created filenames. This can be useful when it is necessary to separate data by digitizer. This option should ONLY be used together with the 'Unique Filenames' selection AND use of 'Channel list' to configure multiple archivers to each write data from a single digitizer, otherwise confusing filenames could result. (Dynamic Parameter)
Name: IncludeDig
Type: boolean
Default: false
Example: IncludeDig=false

Scale factor for scaling data (by dividing) before storage
Name: ScaleDivisor
Type: double
Range: 0.00001 to 10000000
Default: 1.0
Example: ScaleDivisor=1.0

SUDS Format Data Archiver

A multi channel PC-SUDS format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as multichannel PC-SUCS files.

The output filenames are constructed from a combination of the starting time of the first sample in the file and the UnitID, as follows:

```
yyyymmddhhmmss.UnitID.dmx
```

A Julian day filenaming option is supported.

One file is typically created for all channels that are being recorded. Time is taken from the time of the first data that is to be recorded, NChannels, UnitID and ChanID are taken from the RuntimeParams.

Because PC-SUDS format requires the one character Component ID to be unique, the formatter assigns sequential Component IDs from the sequence 1-9, A-Z, a-z. Therefore, a limit of 61 components (channels) per file is imposed.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the recorder.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created SUDS files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

If set, causes the formatter to record only channels at the specified sample rate. This is provided as a convenience when some channels are recorded at one sample rate and sent by telemetry at a different sample rate.
Name: OnlySPS
Type: choice
Choices: Unused,1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

SEISLOG Format Data Archiver

A multi channel SEISLOG format archiver for samples. The module takes data in that is a multichannel data stream and writes it out as a single SEISLOG generic input file per digitizer. These files are generally intended to be a continuously fed data stream to be digested and processed by SEISLOG. The SEISLOG folks call this format the SEISLOG File Stream or SFS, format.

The output filename is constructed from a combination of the starting time of the first sample in the file, and stream name, which is generally the digitizer's station ID:

```
yyyymmddhhmmss.sss_stream.dat
```

Note that station identifiers and component names are not contained in this data, and are set within SEISLOG. Each stream will be written to a separate subdirectory under the output directory using the digitizer names. These directories should be specified to SEISLOG as the source of the incoming data.

One file is created for each stream that is being recorded. Time is taken from the time of the first data that is to be recorded. Other information comes from the input data or the runtime parameters.

Channels to be recorded are taken from a comma delimited parameter string in the module config file called simply "Channels". The list includes an entry for each digitizer/channel, for example:

```
Channels=kmi:1,kmi:2,kmi:3,qtr:1,qtr:2,qtr:3
-- or --
Channels=*
```

The channel list, validated against NChannels is used to determine the list of channels to be recorded, and helps extract the parameters that should be recorded from all the channels sent to the recorder.

To allow for continuous recording or event recording of long files, the module takes data arrivals and writes them to temporary data files of samples and header information. These files are periodically flushed, closed, and reopened for append (every 10 seconds).

Category: OUTPUTFORMATTER
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created SEISLOG files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \seislog\incoming2\
Example: OutputDir=\seislog\incoming2\

List of digitizers: channels to be recorded, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

If set, causes the formatter to record only channels at the specified sample rate. This is provided as a convenience when some channels are recorded at one sample rate and sent by telemetry at a different sample rate.
Name: OnlySPS
Type: choice
Choices: Unused,1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

Link to external data source

Category: EXTDATALINK

EXTDATALINK modules provide an interface between Rockhound and data sources that are external to Rockhound itself.

Typically, an EXTDATALINK module operates without a direct subscription/publication interface to other Rockhound modules. One example of an EXTDATALINK module is the NMSQueueMonitor module, which was originally developed to monitor an NMS file creation queue, and broadcast the existence of these files for handling by other Rockhound modules - for example, so that they can be sent to another computer via an FTPSender module.

NMS Queue Monitor

The NMSQueueMonitor module was originally developed to monitor an NMS file creation queue, and broadcast the existence of these files for handling by other Rockhound modules - for example, so that they can be sent to another computer via an FTPSender module.

Category: EXTDATALINK
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Queue file (list) to be monitored. Specify full path.
Name: NMSQueueFile
Type: String
Range: 1 to 128 characters
Default: none
Example: NMSQueueFile=string

Frequency to check for new files, in minutes
Name: ScanFrequency
Type: double
Range: 0.001 to 10000
Default: 1.0
Example: ScanFrequency=1.0

Auto File sender

Category: FILESENDER

The FILESENDER is used to transmit files recorded on Rockhound to a data archival site as indicated by the user. Each time that Rockhound records a new file, the sender will be notified of the new file, and will begin the process of transferring the files.

The FILESENDER is an entire category of file delivery mechanisms.

FTP File Sender

The FTPSender module is used to transmit recorded files to an FTP site as designated by the user. The setup and maintenance of the FTP site are the responsibility of the user.

The FTPSender module requires you to set up several parameters for proper communication with your FTP server. These include:

FTP HOST - Provides the IP address of your FTP server where files are to be placed.
FTP User - The username used to log into your FTP server.
FTP Password - The FTP password used to log into your FTP server.
Base Directory - The base directory at which to place files on your FTP server. Often, this is something like "pub\incoming".
Directory Layout - How you want the files stored on your FTP server. You can choose to store the files in a flat structure (just at the base directory you specified), or to create subdirectories based on the Rockhound ID or based on the current date.

The FTPSender module queues all file transfer requests to non-volatile storage, so that file transfers are not forgotten if there is a restart before the module is able to complete all file transfers.

In addition, the FTPSender module will perform FTP retries up to 10 times attempting to get through to your FTP server.

Category: FILESENDER
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

FTP server. e.g.: myserver.com or 10.0.0.1
Name: Host
Type: String
Range: 0 to 80 characters
Default: none
Example: Host=string

FTP user for login to the FTP site, e.g.: fred
Name: User
Type: String
Range: 0 to 80 characters
Default: anonymous
Example: User=anonymous

FTP password for login to the FTP site, e.g.: mypassword
Name: Password
Type: String
Range: 0 to 80 characters
Default: ROCK
Example: Password=ROCK

Semicolon separated list of file extensions to send
Name: FileExtensions
Type: String
Range: 1 to 128 characters
Default: m;evt;txt
Example: FileExtensions=m;evt;txt

FTP base directory for where to place files on the FTP site, e.g.: pub/incoming
Name: BaseDir
Type: String
Range: 0 to 80 characters
Default: none
Example: BaseDir=string

Directory structure for how to store uploaded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION
Default: FLAT
Example: DirLayout=FLAT

Passive FTP mode, to be used when FTP server does not support active mode
Name: PassiveMode
Type: boolean
Default: false
Example: PassiveMode=false

Count of number of retries before giving up on a file send
Name: RetryCount
Type: int
Range: 1 to 200
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds
Name: RetryDelaySec
Type: int
Range: 1 to 200
Default: 10
Example: RetryDelaySec=10

Maximum delay between retries as retry interval is doubled, in seconds
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

SCP File Sender

The SCPSender module is used to transmit recorded files to an SSH server as designated by the user. The setup and maintenance of the SSH server are the responsibility of the user.

The SCPSender module requires you to set up several parameters for proper communication with your SSH server. These include:

SSH Server - Provides the IP address of your SSH server where files are to be placed.
SSH User - The username used to log into your SSH server.
SSH Password - The password used to log into your SSH server.
Base Directory - The base directory at which to place files on your SSH server. Often, this is something like "pub\incoming".

The SSHSender module queues all file transfer requests to non-volatile storage, so that file transfers are not forgotten if there is a restart before the module is able to complete all file transfers.

In addition, the SSHSender module will perform SSH retries up to 10 times attempting to get through to your SSH server.

Category: FILESENDER
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

SCP server. e.g.: myserver.com or 10.0.0.1 (Dynamic Parameter)
Name: Host
Type: String
Range: 0 to 80 characters
Default: none
Example: Host=string

SCP user for login to the SCP server, e.g.: fred (Dynamic Parameter)
Name: User
Type: String
Range: 0 to 80 characters
Default: anonymous
Example: User=anonymous

SCP password for login to the SCP server, e.g.: mypassword. If using pre-shared keys do not put a password here, but instead specify the fully qualified path to the private key. e.g.: /root/.ssh/id_dsa (Dynamic Parameter)
Name: Password
Type: String
Range: 0 to 256 characters
Default: none
Example: Password=string

Semicolon separated list of file extensions to send
Name: FileExtensions
Type: String
Range: 1 to 128 characters
Default: m;evt;txt
Example: FileExtensions=m;evt;txt

SCP base directory for where to place files on the SCP server, e.g.: /pub/incoming. MUST ALREADY EXIST. NOTE: Slashes must match those expected by the SCP server (Dynamic Parameter)
Name: BaseDir
Type: String
Range: 0 to 80 characters
Default: none
Example: BaseDir=string

Destination permissions mask. 0644 = RW for owner, RO all others (Dynamic Parameter)
Name: Permissions
Type: String
Range: 0 to 80 characters
Default: 0644
Example: Permissions=0644

Count of number of retries before giving up on a file send
Name: RetryCount
Type: int
Range: 1 to 200
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds
Name: RetryDelaySec
Type: int
Range: 1 to 200
Default: 10
Example: RetryDelaySec=10

Maximum delay between retries as retry interval is doubled, in seconds
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

E-Mail File Sender

The EMailFileSender module is used to e-mail recorded files as attachments to a user via UUENCODEd SMTP to an e-mail account designated by the user. The setup and maintenance of the e-mail account are the responsibility of the user. This module is not used for sending text notifications to users - for that function, see the E-Mail Message Sender module.

The EMailFileSender module queues all file transfer requests to non-volatile storage, so that file transfers are not forgotten if there is a restart before the module is able to complete all file transfers.

NOTE: If you wish you can set up your own mail server to handle the e-mail messages, or you may select "Use KMI Relay" and you may relay your messages through the Kinemetrics relay. If you use the KMI Relay, several parameters such as Mail Host, From User, Password and Port are ignored and handled by the KMI Relay.

Category: FILESENDER
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

Domain name that the mail is coming from, like yourhost.com. Mail will be sent as coming from UnitID@yourhost.com.
Name: Domain
Type: String
Range: 0 to 512 characters
Default: none
Example: Domain=string

Parameters added to module specific .cfg file:

Use the KMI relay to send e-mail messages. If used, you DO NOT need to specify the Mail Host, From User, Password, or Port
Name: UseKMIRelay
Type: boolean
Default: true
Example: UseKMIRelay=true

SMTP Mail host. e.g.: mail.myhost.com. NOTE: Not needed if using the KMI Relay
Name: MailHost
Type: String
Range: 0 to 80 characters
Default: none
Example: MailHost=string

User that the mail is directed to. e.g.: marsha@yourhost.com
Name: ToUser
Type: String
Range: 0 to 80 characters
Default: none
Example: ToUser=string

User that the mail is coming from. If not specified, the system will use a combination of the Unit ID and the Domain, both found in the hardware parameters - such as userid@domain. NOTE: Not needed if using the KMI Relay
Name: FromUser
Type: String
Range: 0 to 80 characters
Default: none
Example: FromUser=string

ESMTP authentication user:password to be supplied to ESMTP authentication using AUTH LOGIN. NOTE: Not needed if using the KMI Relay
Name: Password
Type: String
Range: 0 to 80 characters
Default: none
Example: Password=string

Subject line for the mailed file
Name: Subject
Type: String
Range: 0 to 80 characters
Default: none
Example: Subject=string

Text message sent with file. Can redirect message text from a file (@file), or can contain '^' delimited tokens from the Run Time Parameters
Name: Message
Type: String
Range: 0 to 512 characters
Default: none
Example: Message=string

Semicolon separated list of file extensions to send
Name: FileExtensions
Type: String
Range: 1 to 128 characters
Default: m;evt;txt
Example: FileExtensions=m;evt;txt

Count of number of retries before giving up on a file send
Name: RetryCount
Type: int
Range: 1 to 200
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds
Name: RetryDelaySec
Type: int
Range: 1 to 200
Default: 10
Example: RetryDelaySec=10

Maximum delay between retries as retry interval is doubled, in seconds
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

IP Port used for SMTP connections by the mail host. Default is 25, but may be changed by host for security purposes. NOTE: Not needed if using the KMI Relay
Name: Port
Type: int
Range: 1 to 32767
Default: 25
Example: Port=25

Command console

Category: COMMANDCONSOLE

The COMMANDCONSOLE provides a command interface to Rockhound, allowing the user to communicate with Rockhound.

This COMMANDCONSOLE interface may take the form of a TELNET interface, an RS-232 interface, a GUI, or could be used to emulate previous generation Kinemetrics equipment or even that of other suppliers.

Command console

The Command Console is a text mode command interface used to allow the user and/or external software (such as Kinemetrics' ROCKTalk program) to communicate with Rockhound. A Command Console module is included in all Rockhound configurations.

The command console is available at the IP address of Rockhound, at the port number specified by the Rockhound configuration.

The user may communicate with the Command Console (and therefore with Rockhound) by making a TELNET connection to it. For example, from Windows or Linux, you would use the command:

```
TELNET 127.0.0.1 9900
```

Where "127.0.0.1" is replaced by the IP address of Rockhound, and "9900" is replaced by the Command Console port selected in the Rockhound configuration.

The Command Console provides a basic HELP interface to give simple lists of available commands and syntax of commands. For example:

```
Welcome to Rockhound Station MYSTATION

> help
Help Options:

        Help std       - List standard commands
        Help adv       - List advanced commands
        Help all       - List all commands
        Help *         - Help for every command
        Help {command} - Help for a specific command
```

HELP STD lists 'standard' user level commands. HELP ADV lists more advanced commands generally unneeded by most users, and HELP ALL lists all commands as follows:

```
> help all
Standard Commands:
CLREVT          CLS             CTIME           DATAFLOW        DIR
EXIT            GPS             HELP            KBTRI           LS
NWDEFER         RUN             SNSCAL          STIME           VER
Advanced Commands:
ALARM           BASEDIR         BATTERYTEST     BROADCAST       CALCHECK
CALIBRATE       CRFLUSH         DACCHECK        DSPCMD          ECHO
EEPROM          EXTCHARGERTEST  HOSTSERVICES    HWID            LOOPBACKATE
MINFO           MKBATCH         MSGLEVEL        MSTIME          NOISETEST
OWSBCHECK       PAUSE           PING            PLLCHECK        RECONFIG
```

```
RSVERIFY        RTPARAMS        SETDEBUGMASK    SLEEP           SOHCHECK
SOHFLUSH        STEP            TEMPCHECK       UNSTEP          USERSTAT
VALIDATE        VCOCHECK        VCOSTABLE       VCOVERIFY       VMBYTES
VMEXIT          VMGC            VMPROPS         VTDSET          WATCHDOGTEST
```

Help can also describe a particular command:

```
> help cls

CLS - Clears the screen.
Usage: CLS
```

And HELP will intervene if you supply an incorrect type or number of command arguments:

```
> del
ERROR

DEL - Delete a file or an empty directory.
Usage: DEL {filename}
```

HELP * will display a list of all commands and all help modes, as follows:

```
> help *
ALARM - Set the state of the Rock Alarm bit.
Usage: ALARM on|off

BASEDIR - Report the base installation directory.
Usage: BASEDIR

BATTERYTEST - Command a power supply battery test.
Usage: BATTERYTEST secs

BROADCAST - Send a message to all modules.
Usage: BROADCAST {command} [optional argv1] [optional argv2] [...]

CALCHECK - Checks front end calibration in the 20V range.
  (intended for factory use only)
Usage: CALCHECK zerorange fsrange

CALIBRATE - Performs and reports calibration.
  (intended for factory use only)
Usage: CALIBRATE fec/dac/avx/view/grade

CLREVT - Clear event counter.
Usage: CLREVT

CLS - Clears the screen.
Usage: CLS

CRFLUSH - Request an early flush of continuously recorded data files.
Usage: CRFLUSH

CTIME - Display the current time.
Usage: CTIME

DACCHECK - Checks DAC calibration in the 20V range.
  (intended for factory use only)
Usage: DACCHECK zerorange fsrange

DATAFLOW - Display current Data Flow stats.
Usage: DATAFLOW
```

```
DIR - Display a complete directory lising.
Usage: DIR {path}

DSPCMD - Send a command to the Rock DSP.
Usage: DSPCMD (addr) (cmd)

ECHO - Turns character echo on/off.
Usage: ECHO {on|off}

EEPROM - Display status of board ID EEPROMs.
Usage: EEPROM

EXIT - Exits the console session.
Usage: EXIT

EXTCHARGERTEST - Command a power supply external charger test.
Usage: EXTCHARGERTEST mins

GPS - GPS and Timing control functions.
Usage: GPS STAT: Timing system status
       GPS ID: Timing system type and version
       GPS RUN: Enable timing system
       GPS STOP: Disable timing system
       GPS ON: Turn on GPS power
       GPS OFF: Turn off GPS power
       GPS DIAG on|off|val: Timing system diagnostics
          vals: 1=Time reports        2=Time verifies
          vals: 4=Time quality        8=Time syncs
          vals: 10=Position reports  20=State of health
          vals: 40=Satellites & SNRs
       GPS DAC on|off: Timing system TCXO reports

Help Options:
        Help std       - List standard commands
        Help adv       - List advanced commands
        Help all       - List all commands
        Help *         - Help for every command
        Help {command} - Help for a specific command

HOSTSERVICES - Report current services and associated port numbers.

HWID - Display the hardware ID string.
Usage: HWID

KBTRI - Keyboard trigger.
Usage: KBTRI (secs)

LOOPBACKATE - Performs factory ATE loopback using special test hardware.
  (intended for factory use only)
Usage: LOOPBACKATE typ arglist

LS - Display a brief directory listing.
Usage: LS {path}

MINFO - Display info about currently loaded modules.
Usage: MINFO

MKBATCH - Creates a batch file by typing in lines of commands.
Usage: MKBATCH file

MSGLEVEL - Set the level of messages sent to this session.
Usage: MSGLEVEL {level, 0=None, 1=Critical, 2=All}
```

```
MSTIME - Display the system time in milliseconds since Epoch.
Usage: MSTIME

NOISETEST - Performs and reports a main channel noise test.
  (intended for factory use only)
Usage: NOISETEST

NWDEFER - Defers network triggering temporarily.
Usage: NWDEFER secs

OWSBCHECK - Check the One-Wire Sensor Bus by testing for
device discovery on each active sensor bus channel.
  (intended for factory use only)
Usage: OWSBCHECK

PAUSE - Pause and wait for user input.
Usage: PAUSE

PING - Request a PONG reply.
Usage: PING [optional reply text]

PLLCHECK - Checks clock drift and VCO range.
  (intended for factory use only)
Usage: PLLCHECK lcerange vcorange

RECONFIG - Command re-read of the configuration files.

RSVERIFY - Verify that unit has not restarted under stress test conditions.
  Arg=0 saves current restart for later comparison.
  Arg!=0 checks restart count against saved.
  (intended for factory use only)
Usage: RSVERIFY rsflag

RTPARAMS - Display current system runtime parameters.
Usage: RTPARAMS [optional key-match]

RUN - Run a batch file by executing commands
  in it as if they were typed.
Usage: RUN file

SETDEBUGMASK - Set the debug mask for a given module.
Usage: SETDEBUGMASK {module} [value (default=0)]

SLEEP - Sleep the specified number of seconds.
Usage: SLEEP seconds

SNSCAL - Do sensor calibration.
Usage: SNSCAL (type)

SOHCHECK - Checks BF analog voltage values.
  (intended for factory use only)
Usage: SOHCHECK value range (10 each)

SOHFLUSH - Request a flush of SOH data files when using the optional web server interface.
Usage: SOHFLUSH

STEP - Apply the sensor step voltage.
Usage: STEP

STIME - Display the system start time.
Usage: STIME
```

```
TEMPCHECK - Checks temperature against actual. Range
  against expected must allow for case rise.
  (intended for factory use only)
Usage: TEMPCHECK expected range

UNSTEP - Remove the sensor step voltage.
Usage: UNSTEP

USERSTAT - Write numeric parameter to user status stream.
Usage: USERSTAT num

VALIDATE - Validates firmware or config update. If valid may cause restart.
Usage: To validate and restart: VALIDATE UPDATE
       To validate and dynamically reconfigure: VALIDATE RECONFIG

VCOCHECK - Check the VCO response by offsetting and monitoring drift.
  (intended for factory use only)
Usage: VCOCHECK secs vcodelta mindrift maxdrift

VCOSTABLE - Sets VCO initial value for stable temperature and GPS locked.
  (intended for factory use only)
Usage: VCOSTABLE

VCOVERIFY - Verify that VCO has not changed. Arg=0 saves current VCO for
later comparison. Arg!=0 checks VCO against saved.
  (intended for factory use only)
Usage: VCOVERIFY vcorange

VER - Display the software and hardware version numbers.
Usage: VER

VMBYTES - Display the total bytes available, and bytes free in the Virtual Machine.
Usage: VMBYTES

VMEXIT - Exits the Virtual Machine, restarting...
Usage: VMEXIT

VMGC - Force Garbage Collection in the Virtual Machine.
Usage: VMGC

VMPROPS - Display the Virtual Machine properties.
Usage: VMPROPS

VTDSET - Set voltage range during ATE testing. 0=2.5V, 1=5V, 2=20V
  (intended for factory use only)
Usage: VTDSET range

WATCHDOGTEST - Cause a system restart via a software watchdog.
Usage: WATCHDOGTEST
```

NOTE 1: For security reasons, the CAT, COPY, DEL, REN, and REGISTERMODULE commands are disabled by default. You can edit the list of disabled commands by changing the "Disabled console commands" parameter of the command console module. This list cannot be empty. If you truly want no commands restricted, enter "NONE".

NOTE 2: With the above list of commands disabled at the console, the console is not a significant security risk. However, to provide an extra level of security, users are encouraged to use a console password. This is done by editing the "Console password" parameter, (a console password is provided by default). Be sure to set the "Console password" parameter and ROCKTalk's Console password for the selected Rockhound to the same value. If you do not set the two password values the same, then ROCKTalk will be unable to communicate with Rockhound. The password field cannot be empty. If you truly want no password, enter "NONE".

Remember that passwords are case sensitive!

Category: COMMANDCONSOLE
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Console commands disabled for security reasons. If you want no commands disabled, enter NONE here. (Dynamic Parameter)
Name: DisabledCmds
Type: String
Range: 1 to 512 characters
Default: cat copy del ren registermodule
Example: DisabledCmds=cat copy del ren registermodule

Password used to allow console logins. If you want no password, enter NONE here. (Dynamic Parameter)
Name: ConsolePassword
Type: String
Range: 1 to 512 characters
Default: kmi
Example: ConsolePassword=kmi

TCP Port number for the console, should be greater than 5000
Name: TCPPort
Type: int
Range: 5000 to 32767
Default: 9900
Example: TCPPort=9900

Echo is done by the command console for full duplex communications. This should be disabled if using some TELNET or similar clients that do not allow disabling of local echo within TELNET. (Dynamic Parameter)
Name: Echo
Type: boolean
Default: true
Example: Echo=true

Determine echo mode automatically if possible by using TELNET IAC commands. Will echo depending on the response from the TELNET or similar client. (Dynamic Parameter)
Name: AutoEcho
Type: boolean
Default: true
Example: AutoEcho=true

System monitoring utilities

Category: MONITOR

The MONITOR is one of the required modules in every Rockhound layout, in the same sense that the COMMANDCONSOLE is required in every Rockhound layout.

The Update Monitor scans the injar directory looking for updated firmware loaded as "ftpupdate.jar" or for updated configuration loaded as "ftpconfig.jar". If these files appear, the monitor will continue to poll until the size of these files stabilizes (to allow for slow uploads to the unit), and then will cause a restart of Rockhound after validating the contents of the updated .jar files.

If the .jar files validate, they are renamed without the "ftp" prefix, and Rockhound is restarted.

If the .jar files do not validate they are deleted, a message is posted, and scanning continues.

The module provides several related capabilities:

1) Automatic firmware and configuration updates to Rockhound from your remote FTP client. Transfer the necessary files to the Rockhound injar directory, and after about 10 minutes, this module will recognize the updated files and will validate them and restart Rockhound using the new files.

2) Validation and use of updated files transferred using ROCKTalk. If ROCKTalk transfers new firmware or configuration, it will use the same naming convention (ftpxxx.jar). After completing the transfer, ROCKTalk will issue the VALIDATEUPDATE command to the COMMANDCONSOLE which will cause the polling loop to be cut short, and any remaining ftpxxx.jar files are validated before Rockhound restarts.

3) Remote firmware updates. Support is provided for automatic remote firmware and/or parameter configuration updates. To support this, you must provide an FTP server and configure the address and access passwords into the module's configuration. Periodically, the module will connect to your FTP server and will check "firmware_allunits.jar" (firmware updates that apply to all units), "firmware_xxx.jar" (firmware update to unit xxx), or "config_xxx.jar" (parameter updates for unit xxx). These files are fetched and installed if they are different (by file timestamp) from those currently installed. This capability allows easier maintenance of multiple units including those without a full time network connection. See FTP server considerations.

Remotely loaded configuration files are named for each unit, whereas firmware files are named for each unit, or as "allunits" meaning that the update applies to all remotely connected units. This among other things allows you to update the firmware of selected units for a test before deploying updated firmware on all units.

4) Parameter CRC verification. The module will periodically check the integrity of the parameters being used by computing a CRC of the parameters and comparing this with the current parameter configuration files. If the parameter CRCs do not match (perhaps due to parameter corruption), then the module will force recycling of the parameters from the archived parameter configuration file or by downloading a fresh copy from the remote update FTP server.

Update monitor

Category: MONITOR
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Frequency to check for remote configuration or firmware updates, in hours. If remote updates are enabled, parameter and firmware updates will also be checked for remote updates at this interval. Set the interval to zero to disable remote updates. (Dynamic Parameter)
Name: ScanFrequency
Type: int
Range: 0 to 1000
Default: 0
Example: ScanFrequency=0

Remote update FTP server. e.g.: myserver.com or 10.0.0.1. Set this parameter blank to disable remote updates, or set it to the FTP server that will contain firmware and configuration updates. (Dynamic Parameter)
Name: Host
Type: String
Range: 0 to 80 characters
Default: update.kmi.com
Example: Host=update.kmi.com

Remote update FTP user for login to the FTP site, e.g.: fred (Dynamic Parameter)
Name: User
Type: String
Range: 0 to 80 characters
Default: update
Example: User=update

Remote update FTP password for login to the FTP site, e.g.: mypassword (Dynamic Parameter)
Name: Password
Type: String
Range: 0 to 80 characters
Default: auto
Example: Password=auto

FTP base directory for where to get files on the FTP site, e.g.: pub/incoming
Name: BaseDir
Type: String
Range: 0 to 80 characters
Default: none
Example: BaseDir=string

Passive FTP mode, to be used when FTP server does not support active mode (Dynamic Parameter)
Name: PassiveMode
Type: boolean
Default: false
Example: PassiveMode=false

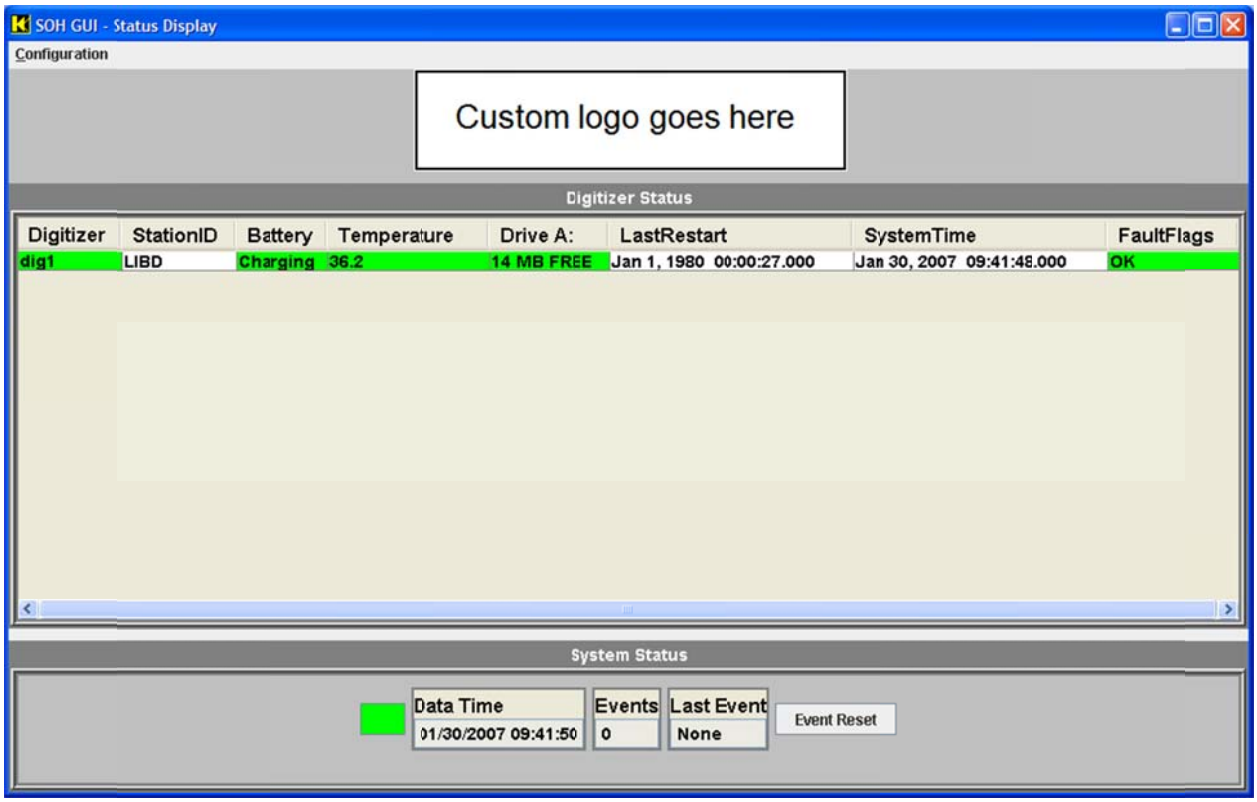
Status Display GUI

Category: STATUSDISPLAYGUI

The Status display GUI module provides a simple GUI status display showing overall system and digitizer status. These GUI interfaces must run on a system that has a graphics display (such as a PC).

Status Display GUI (Desktop Only)

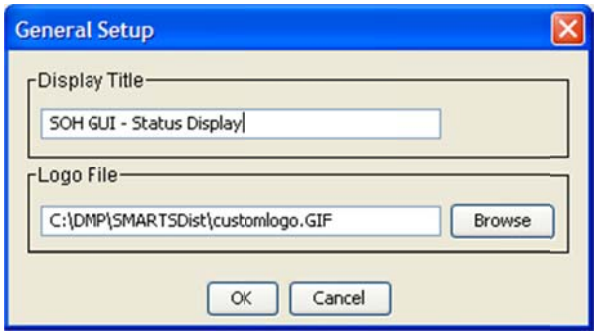
The SOH display GUI is a module that can be added to a Rockhound layout to show status of the digitizers in the layout. The display shows overall system status and configurable digitizer status as shown here:



SOH GUI Main screen

The panes of the GUI show the user selectable title and logo, followed by the list of digitizers (one per line) with their status, and finally the overall system status.

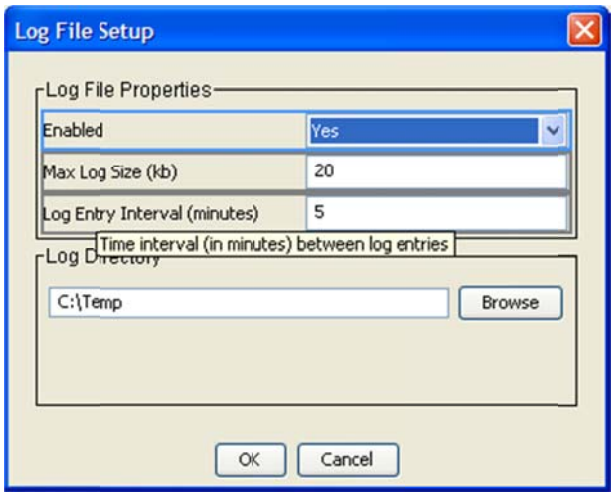
The GUI includes a menu that provides access to configuration GUIs that allow customization.



General Setup

General Setup allows you to change:

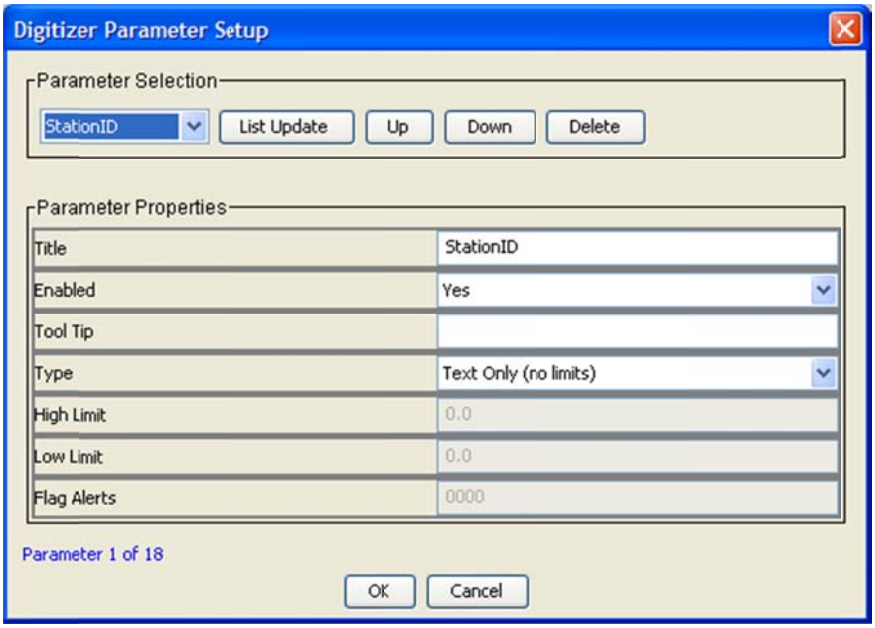
Display Title - Sets the title displayed at the top of the GUI
Logo File - Sets the logo displayed just under the menu at the top of the display



Log File Setup

Log File Setup allows you to change:

Enabled - Whether SOH logs for each digitizer are enabled
Max Log Size - Maximum log size of each log file in kB. Beyond this size, the files are trimmed.
Log Entry Interval - How often SOH data is written to the log file
Log Directory - Where SOH log files are stored



Digitizer Parameter Setup

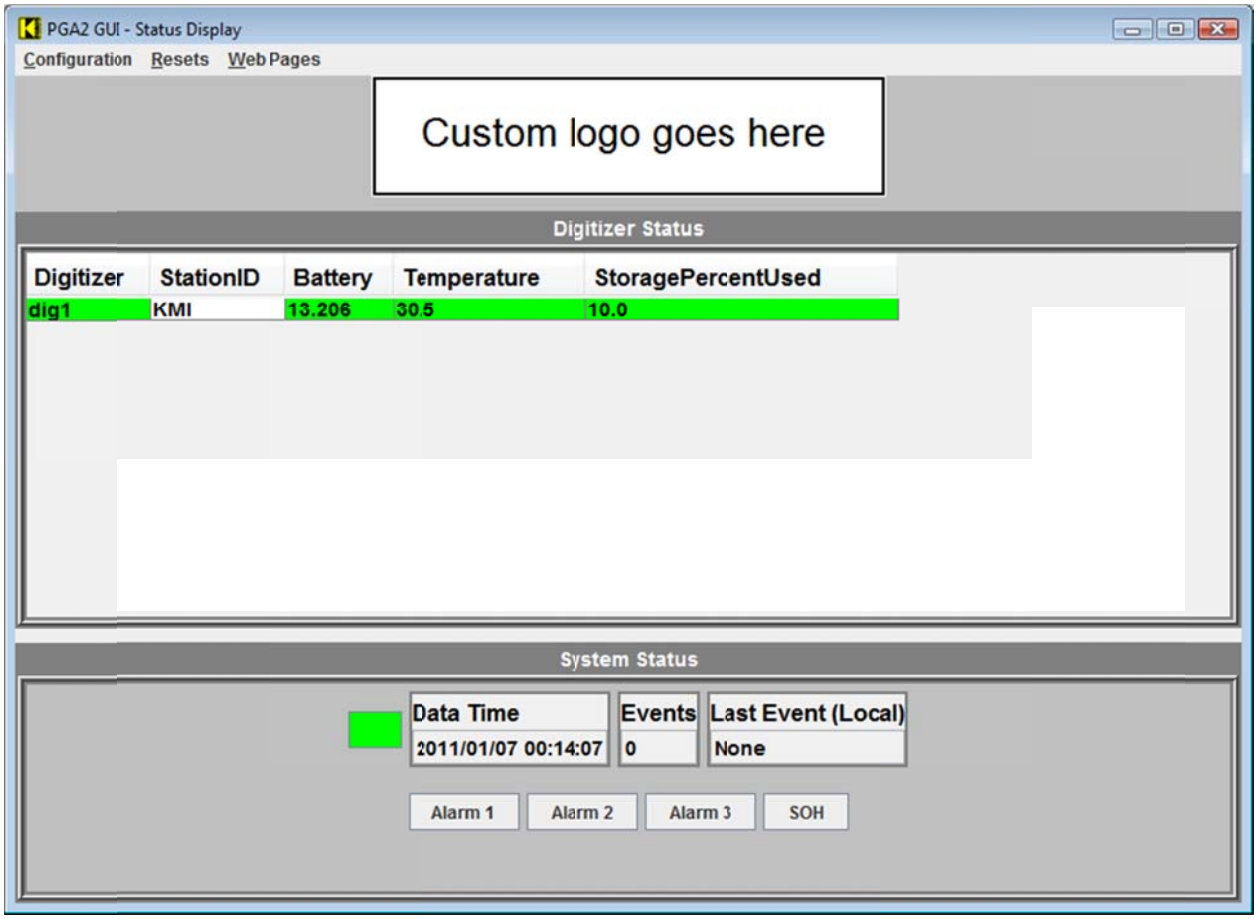
Digitizer Parameter Setup allows you to change:

StationID - Allows you to select from the available SOH variables
List Update - Reads a list of available SOH variables from the digitizer so that you can choose what to display
Up - Moves the selected SOH data item "up" (left) on the SOH display
Down - Moves the selected SOH data item "down" (right) on the SOH display
Delete - Deletes the selected SOH item from the list of available items
Title - Sets the displayed title for the selected SOH item
Enabled - Enables or disables the selected SOH item
Tool Tip - Sets the displayed tool tip for the selected SOH item
Type - Sets the type of data of the selected SOH item so that you can set limits of "good" and "bad" values
High Limit - Sets the high limit of "good" values for the selected SOH item
Low Limit - Sets the low limit of "good" values for the selected SOH item
Flag Alerts - Sets flag bits that are of interest for a selected SOH item whose type is "Flags"

Category: STATUSDISPLAYGUI
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output

PGA Alarms Display GUI (Desktop Only)

The SOH display GUI is a module that can be added to a Rockhound layout to show status of the digitizers in the layout. It is used in conjunction with the PGAGPIO module to detect alarm levels and SOH conditions. The display shows overall system status and configurable digitizer status as shown here:

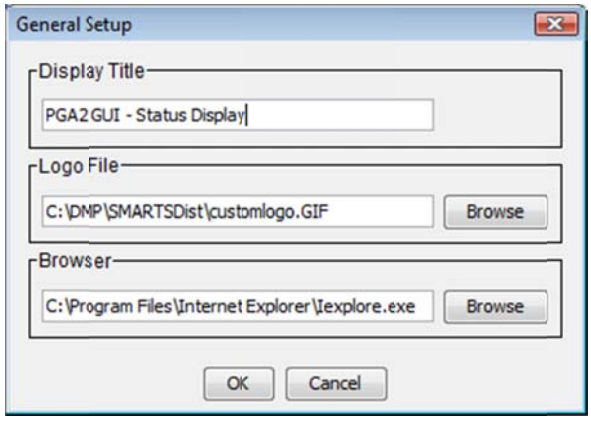


PGASOH GUI Main screen

The panes of the PGAGUI show the user selectable title and logo, followed by the list of digitizers (one per line) with their status, and finally the overall system status. At the bottom of the display are indicators for three alarm levels and SOH alerts as determined by the PGAGPIO module.

Menu items allow reset of alarm and SOH conditions as well as links to the Rockhound web servers of the local (PC based) copy of Rockhound and any digitizers interfaced via their ORB servers.

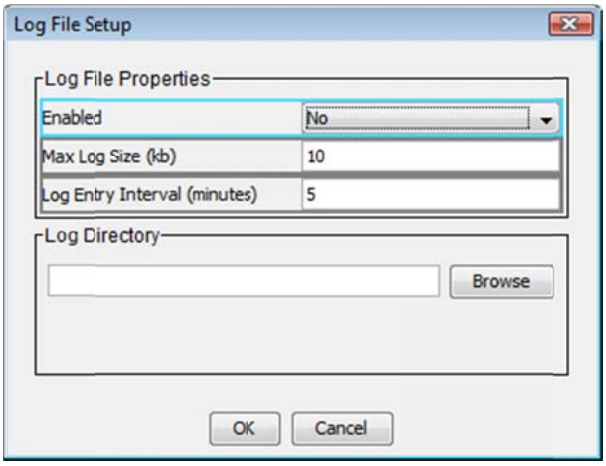
The PGAGUI includes a menu that provides access to configuration GUIs that allow customization.



General Setup

General Setup allows you to change:

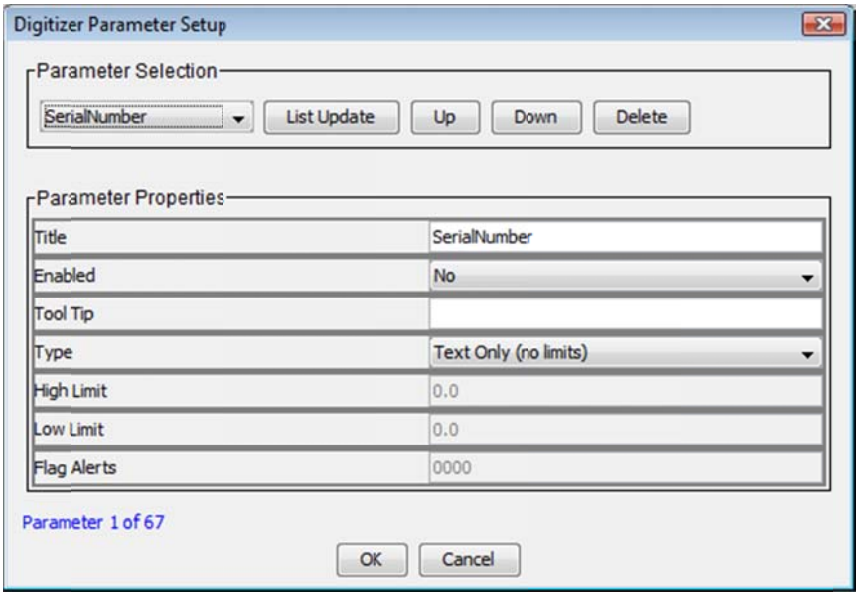
Display Title - Sets the title displayed at the top of the GUI
Logo File - Sets the logo displayed just under the menu at the top of the display



Log File Setup

Log File Setup allows you to change:

Enabled - Whether PGASOH logs for each digitizer are enabled
Max Log Size - Maximum log size of each log file in kB. Beyond this size, the files are trimmed.
Log Entry Interval - How often PGASOH data is written to the log file
Log Directory - Where PGASOH log files are stored



Digitizer Parameter Setup

Digitizer Parameter Setup allows you to change:

StationID - Allows you to select from the available SOH variables
List Update - Reads a list of available SOH variables from the digitizer so that you can choose what to display
Up - Moves the selected SOH data item "up" (left) on the SOH display
Down - Moves the selected SOH data item "down" (right) on the SOH display
Delete - Deletes the selected SOH item from the list of available items
Title - Sets the displayed title for the selected SOH item
Enabled - Enables or disables the selected SOH item
Tool Tip - Sets the displayed tool tip for the selected SOH item
Type - Sets the type of data of the selected SOH item so that you can set limits of "good" and "bad" values
High Limit - Sets the high limit of "good" values for the selected SOH item
Low Limit - Sets the low limit of "good" values for the selected SOH item
Flag Alerts - Sets flag bits that are of interest for a selected SOH item whose type is "Flags"

Category: STATUSDISPLAYGUI
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output

Status serving utilities

Category: STATUSSERVER

Status Server modules provide a way to deliver status information to a remote status monitor.

The Status Server module may take the form of support for a customer-specific status monitor, or may be as simple as the Rockhound Status Server module, which provides for easy viewing of Rockhound status information from a remote site using the STARTS Status Monitor or a similar program.

Status Server

The Status Server module is used to provide a status interface that allows viewing of Rockhound status remotely using the Rockhound Status Monitor or a similarly enabled program. The module utilizes minimal processor overhead whether or not status information is being used by a remote system.

The Status Server module makes status information available to an outside connection for monitoring. This "quick check" can answer many basic questions as to the state of health of the equipment involved.

A Status Server module is added to Rockhound layouts by default, but can be deleted by the user if necessary.

Category: STATUSSERVER
Publishes: Output
Subscribes to: NOTHING

Auto file delete scanner

Category: AFD

AFD modules perform automatic file deletion for the purposes of keeping the file system cleaned up. Many variations of AFD modules are possible, and Kinemetrics provides the most common ones as a standard part of the Rockhound system.

AFD modules perform automatic file deletion for the purposes of keeping the file system cleaned up. Many variations of AFD modules are possible, and Kinemetrics provides the most common ones as a standard part of the Rockhound system.

Aged Auto File Delete

This module will perform auto file deletion of files and subdirs of a given parent dir based on an age limit and file extension.

It attempts its first check for files to be deleted 10 seconds after Rockhound has started. It checks once a day thereafter (or as indicated).

Deletes files older than MaxDaysOld, which reside under the SweepPath and have an extension listed in FileExtensions.

Category: AFD
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Semicolon separated list of paths to scan for deletable files
Name: SweepPath
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: SweepPath=\data\events\

Semicolon separated list of file extensions to scan. '*' means that all files will be scanned.
Name: FileExtensions
Type: String
Range: 1 to 128 characters
Default: m;evt
Example: FileExtensions=m;evt

Age in days at which files are to be deleted
Name: MaxDaysOld
Type: int
Range: 1 to 2000
Default: 365
Example: MaxDaysOld=365

When set, will delete empty directories after one day
Name: DeleteDirectories
Type: boolean
Default: true
Example: DeleteDirectories=true

Frequency to check for possible file deletion, in days
Name: ScanFrequency
Type: double
Range: 0.001 to 365
Default: 1.0
Example: ScanFrequency=1.0

Auto Oldest File Delete

This module will perform auto file deletion of files and subdirs of a given parent dir based on file age and file extension.

The scan is not attempted until the directories occupy the amount of space indicated as the high water mark. Once the high water mark is reached, oldest files are deleted until the files occupy less than or equal to the space designated by the low water mark.

It attempts its first check for files to be deleted 10 seconds after Rockhound has started. It checks once a day thereafter (or as indicated).

Deletes oldest files IF the total space occupied by files is greater than the high water mark. When enough old files are deleted to get storage down below the low water mark, then deletion stops. File candidates reside under the SweepPath and have an extension listed in FileExtensions.

Category: AFD
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Semicolon separated list of paths to scan for deletable files
Name: SweepPath
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: SweepPath=\data\events\

Semicolon separated list of file extensions to scan. '*' means that all files will be scanned.
Name: FileExtensions
Type: String
Range: 1 to 128 characters
Default: m;evt
Example: FileExtensions=m;evt

Limit of storage before deleting files, in mb
Name: StorageMax
Type: double
Range: 0.001 to 99999999999
Default: 100.0
Example: StorageMax=100.0

Once deleting starts, delete to this level, in mb
Name: StorageMin
Type: double
Range: 0.001 to 99999999999
Default: 90.0
Example: StorageMin=90.0

When set, will delete empty directories after one day
Name: DeleteDirectories
Type: boolean
Default: true
Example: DeleteDirectories=true

Frequency to check for possible file deletion, in days
Name: ScanFrequency
Type: double
Range: 0.001 to 365
Default: 1.0
Example: ScanFrequency=1.0

Auto Small EVT File Delete

This module will perform auto file deletion of files and subdirs of a given parent dir based on file average peak to peak and file extension.

The scan is not attempted until the directories occupy the amount of space indicated as the high water mark. Once the high water mark is reached, EVT files with the smallest average peak-to-peak are deleted until the files occupy less than or equal to the space designated by the low water mark.

It attempts its first check for files to be deleted 10 seconds after Rockhound has started. It checks once a day thereafter (or as indicated).

Deletes files with the smallest average peak-to-peak IF the total space occupied by files is greater than the high water mark. When enough old files are deleted to get storage down below the low water mark, then deletion stops. File candidates reside under the SweepPath and have an EVT extension (no others are allowed).

Files newer than 1 hour old are not considered for deletion to assure that a file that is still being created doesn't get deleted.

Category: AFD
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Semicolon separated list of paths to scan for deletable files
Name: SweepPath
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: SweepPath=\data\events\

Limit of storage before deleting files, in mb
Name: StorageMax
Type: double
Range: 0.001 to 99999999999
Default: 100.0
Example: StorageMax=100.0

Once deleting starts, delete to this level, in mb
Name: StorageMin
Type: double
Range: 0.001 to 99999999999
Default: 90.0
Example: StorageMin=90.0

When set, will delete empty directories after one day
Name: DeleteDirectories
Type: boolean
Default: true
Example: DeleteDirectories=true

Frequency to check for possible file deletion, in days
Name: ScanFrequency
Type: double
Range: 0.001 to 365
Default: 1.0
Example: ScanFrequency=1.0

Statistics generator

Category: STATSGENERATOR

Statistics generators are used to generate statistics in parallel to file recording. Depending on the type of statistics generator selected, data can be stored in files or can be placed in the run time parameters so that they may be included in transmissions to the user through a notification method such as e-mail.

Basic statistics generator modules are provided with Rockhound. They determine information such as mean, duration, peaks, and RMS. Custom STATSGENERATOR modules can be created that provide more customer specific processing as needed.

Run Time Parameter Statistics

Provides statistics about the recorded file(s) and each channel of the data. The StatisticsGenerator subscribes to the output of the Recorder in parallel with any OUTPUTFORMATTERs and determines statistics that can be extracted from the data. These statistics are then stored in the run time parameters, and may then be extracted for use with NOTFIER modules or other processing after recording completes.

A sample set of statistics sent to the run time parameters for an event would be as follows:

```
StatisticsGenerator.Type=StatisticsGenerator
StatisticsGenerator.StartTime=2000/12/11 16:36:03.40
StatisticsGenerator.EndTime=2000/12/11 16:36:17.40
StatisticsGenerator.Duration=14
StatisticsGenerator.kmi.ch1.AbsPeak=0.3392209649085999
StatisticsGenerator.kmi.ch1.MinPeak=-0.32354644536972044
StatisticsGenerator.kmi.ch1.MaxPeak=0.3392209649085999
StatisticsGenerator.kmi.ch1.Mean=0.007990872859954834
StatisticsGenerator.kmi.ch1.RmsInG=0.04292945760202232
StatisticsGenerator.kmi.ch1.RmsIndB=30.3551919293144
StatisticsGenerator.kmi.ch2.AbsPeak=0.04420842068535941
StatisticsGenerator.kmi.ch2.MinPeak=-0.028360949584415977
StatisticsGenerator.kmi.ch2.MaxPeak=0.04420842068535941
StatisticsGenerator.kmi.ch2.Mean=-0.025107754639216835
StatisticsGenerator.kmi.ch2.RmsInG=0.0026610821472125815
StatisticsGenerator.kmi.ch2.RmsIndB=54.50913432920303
StatisticsGenerator.kmi.ch3.AbsPeak=0.3553986532347543
StatisticsGenerator.kmi.ch3.MinPeak=-0.3553986532347543
StatisticsGenerator.kmi.ch3.MaxPeak=0.28864669970103674
StatisticsGenerator.kmi.ch3.Mean=0.006163595403943743
```

```
StatisticsGenerator.kmi.ch3.RmsInG=0.023635015449455364
StatisticsGenerator.kmi.ch3.RmsIndB=35.53918214607853
```

Duration is in seconds, times are relative to UTC, and peaks and means have been converted to g based upon the specified full scale and sensitivity values of the sensors used.

Category: STATSGENERATOR
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Summary File Generator

Provides basic summary information about the recorded file(s) and each channel of the data. The SummaryData module subscribes to the output of the Recorder in parallel with any OUTPUTFORMATTERs and determines summary information that can be extracted from the data. This information is then stored in the a text summary file, and may then be further processed or transmitted using functions like the FTPSender module after recording completes.

A sample set of summary data written for an event would be as follows:

```
UnitID: KMI
Start Time: 2001/08/02 14:16:19.40
Trigger Time: 2001/08/02 14:16:22.83
1 Channel(s) Triggered: dig1.ch1
Runtime: 15 seconds
Digitizer/Ch    ChannelID   SPS   Min         Max
dig1.ch1        C1          100   -0.316695   0.341777
dig1.ch2        C2          100   -0.005470   0.005879
dig1.ch3        C3          100   -0.155650   0.182449
```

Duration is in seconds, times are relative to UTC, and peaks have been demeaned and converted to g based upon the specified sensitivity values of the sensors used.

Category: STATSGENERATOR
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created summary files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store created summary files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

List of digitizers: channels to be processed, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

Units used for PGA calculation and formatting. Note that g and cm selections only apply to accelerometers, and only if sensitivity selection is set correctly.
Name: PGAUnits
Type: choice
Choices: Volts,g,cm,gal
Default: g
Example: PGAUnits=g

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

File extension of created summary files (Dynamic Parameter)
Name: FileExtension
Type: String
Range: 1 to 128 characters
Default: txt
Example: FileExtension=txt

JMA Summary File Generator

Computes basic summary information about a recorded file as well as JMA INtensity and dominant frequency in the range of 0.5Hz to 10Hz. The JMA Intensity calculations are performed for each defined set of three channels.

The JMASummary module subscribes to the output of the Recorder in parallel with any OUTPUTFORMATTERs and determines summary information that can be extracted from the data. This information is then stored in the a text summary file along with the computed JMA Intensity information, and may then be further processed or transmitted using functions like the FTPSender module after recording completes.

A sample set of JMA summary data written for an event would be as follows:

```
UnitID: KMI
Start Time: 2001/08/02 14:16:19.40
Trigger Time: 2001/08/02 14:16:22.83
1 Channel(s) Triggered: dig1.ch3
Runtime: 25 seconds
Digitizer/Ch    ChannelID   SPS   Min         Max
dig1.ch1        C01         200   -263.181    389.351
dig1.ch2        C02         200   -373.592    369.342
dig1.ch3        C03         200   -429.038    695.625

JMA Processing:
Channel Groups  Intensity   Dom Freq
C01,C02,C03     5.7         3.6Hz
```

Duration is in seconds, times are relative to UTC, and peaks have been demeaned and converted to gal based upon the specified sensitivity values of the sensors used.

Category: STATSGENERATOR
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Directory to hold created summary files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store created summary files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup1
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup1=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup2
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup2=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup3
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup3=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup4
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup4=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup5
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup5=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup6
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup6=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup7
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup7=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup8
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup8=string

A comma separated list of three channel IDs used to compute JMA intensity values, e.g. C1,C2,C3 (Dynamic Parameter)
Name: ChannelGroup9
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup9=string

Constant K from the Kawasumi equation I=2*log(a0)+K (Dynamic Parameter)
Name: Constant
Type: double
Range: 0 to 2
Default: 0.94
Example: Constant=0.94

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

File extension of created summary files (Dynamic Parameter)
Name: FileExtension
Type: String
Range: 1 to 128 characters
Default: txt
Example: FileExtension=txt

SOH File Generator

The SOH File generator creates SOH based text files that contain time, general SOH status, and user selected run time parameter tokens. SOH files can then be sent using existing file senders such as mail or SCP. SOH file creation can be driven by interval, time of day, or by changes in SOH status.

Category: STATSGENERATOR
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Frequency to generate SOH files, in minutes. Use 1440 for one message each 24 hours, with the first one happening at startup. Zero means no periodic SOH messages. This method will randomly distribute SOH message file creation times naturally over a large pool of instruments. (Dynamic Parameter)
Name: ScanFrequency
Type: int
Range: 0 to 10000
Default: 1440
Example: ScanFrequency=1440

Space separated times of day (2:15 15:54) to create message files. This allows SOH message files to be created at predictable times. If used, then message frequency is NOT USED. (Dynamic Parameter)
Name: MessageTimes
Type: String
Range: 0 to 80 characters
Default: none
Example: MessageTimes=string

Send message files whenever there is an SOH state change. (Dynamic Parameter)
Name: SendOnSOH
Type: boolean
Default: true
Example: SendOnSOH=true

SOH message template. If blank, the created SOH file will contain only a header with the time of the message and any SOH faults. If a template file is specified, it will follow this header information and can contain '^' delimited tokens from the Run Time Parameters. (Dynamic Parameter)
Name: Message
Type: String
Range: 0 to 512 characters
Default: none
Example: Message=string

Number of files to keep. If zero, all files will be given the same name (SOH_NW_STA_SN.txt) and will be overwritten each time. If non-zero, file names will include a timestamp and will be automatically cleaned up (YYYYMMDDHHMMSS_SOH_NW_STA_SN.txt). (Dynamic Parameter)
Name: FilesToKeep
Type: int
Range: 0 to 65000
Default: 0
Example: FilesToKeep=0

Directory to hold SOH files
Name: SOHDir
Type: String
Range: 1 to 128 characters
Default: \data\soh\
Example: SOHDir=\data\soh\

File extension of created SOH files (Dynamic Parameter)
Name: FileExtension
Type: String
Range: 1 to 128 characters
Default: txt
Example: FileExtension=txt

Web Server

Category: HTTPSERVER

The HTTPSERVER provides an HTTP interface to Rockhound, allowing the user to communicate with Rockhound via a web browser.

One HTTPSERVER is provided with Rockhound, others can be designed for specific customer requirements.

Config/Control web server

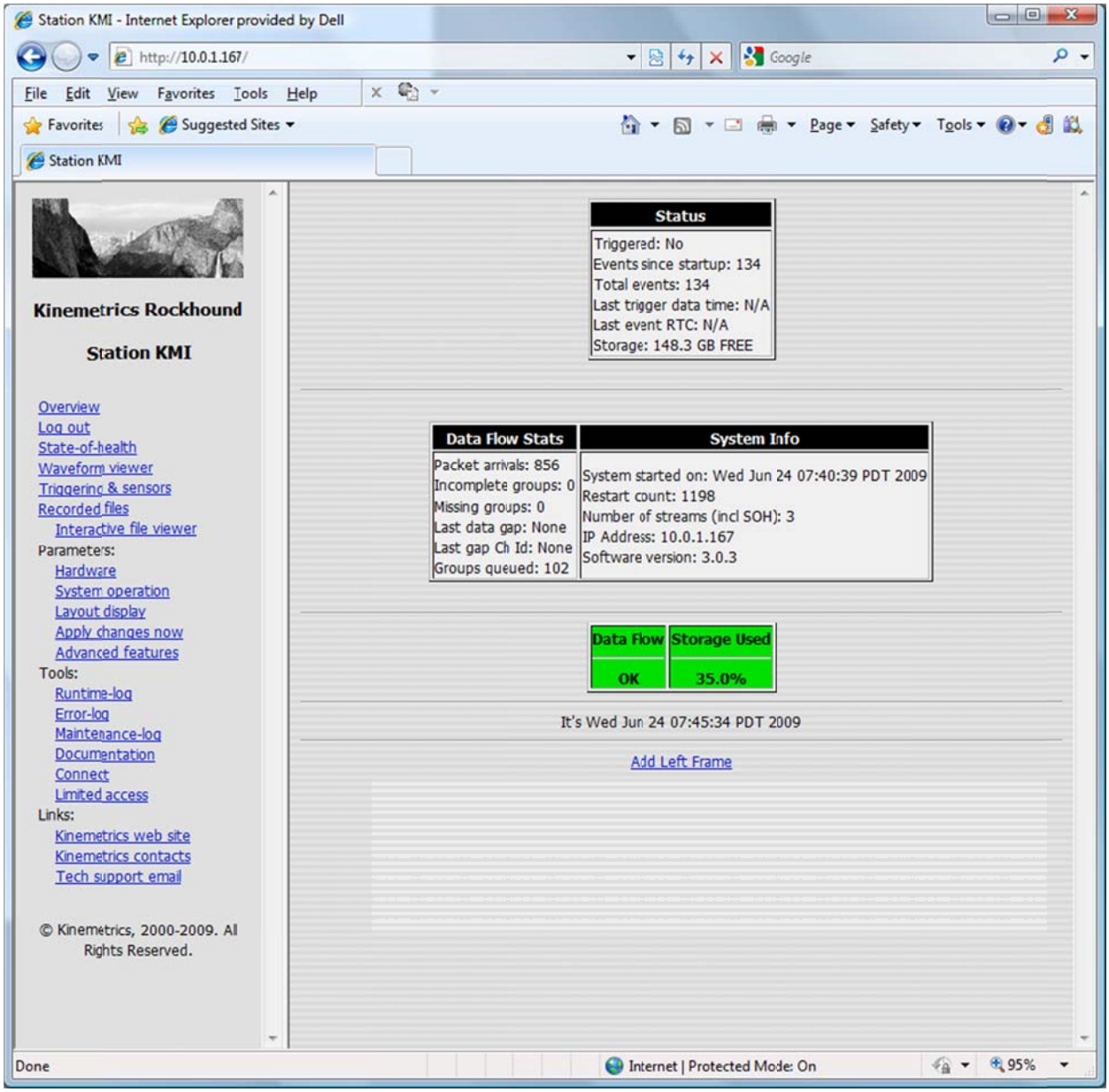
The HTTPConfig module is designed to serve as an alternative interface to Rockhound so that users can access Rockhound using only a web browser. They do not need to install ROCKTalk or even Java (although it is recommended) on their computer in order to access and configure Rockhound. All they need to know is the IP address of the Rockhound system.

Additional capabilities are provided to the user if the computer is equipped with a Java-enabled browser. For example, real-time waveform displays are possible using a downloaded Java applet.

Note: The HTTPConfig module has default configuration parameters that make it operational as soon as Rockhound begins to operate. The minimum requirements are that the module must be added to the Rockhound layout, and a username and password must be defined. In addition, several parameters are available to customize operation including access to an FTP server (if the computer is equipped with one), and a contact link to link to your own web site.

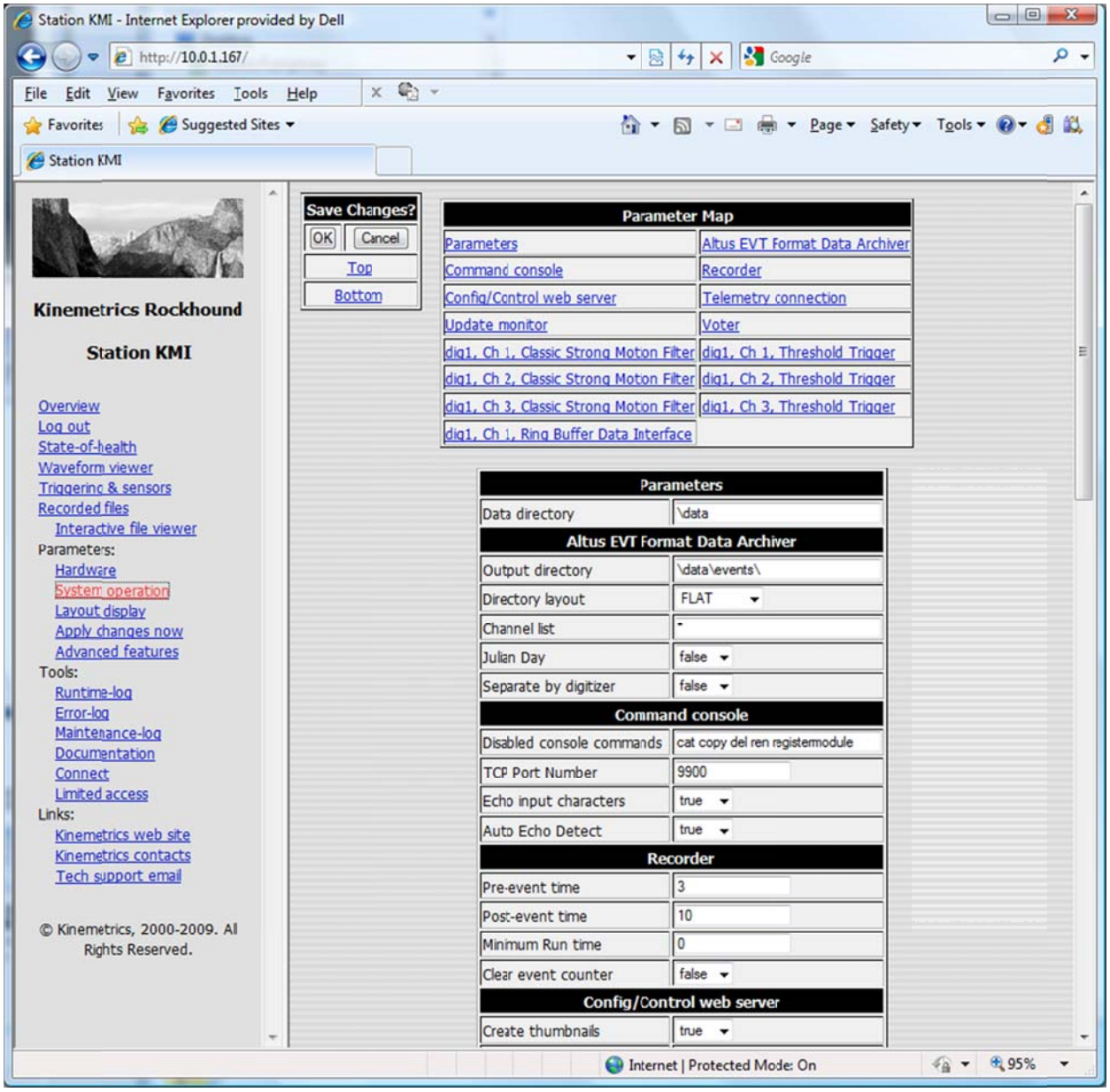
The HTTPConfig module controls user logon using Digest MD5 Authentication. Once logged on, accesses to the HTTPConfig module are allowed from that IP address as long as there is periodic activity. The user will automatically be logged out after one hour of inactivity.

The HTTPConfig module provides an initial page that looks like this. The link near the bottom left allows the user to release Full Access to another user by selecting Limited Access (only one user may have Full Access at a time - all other users are given Limited Access rights - effectively read-only). A link is also provided near the top left that allows the user to log out immediately.



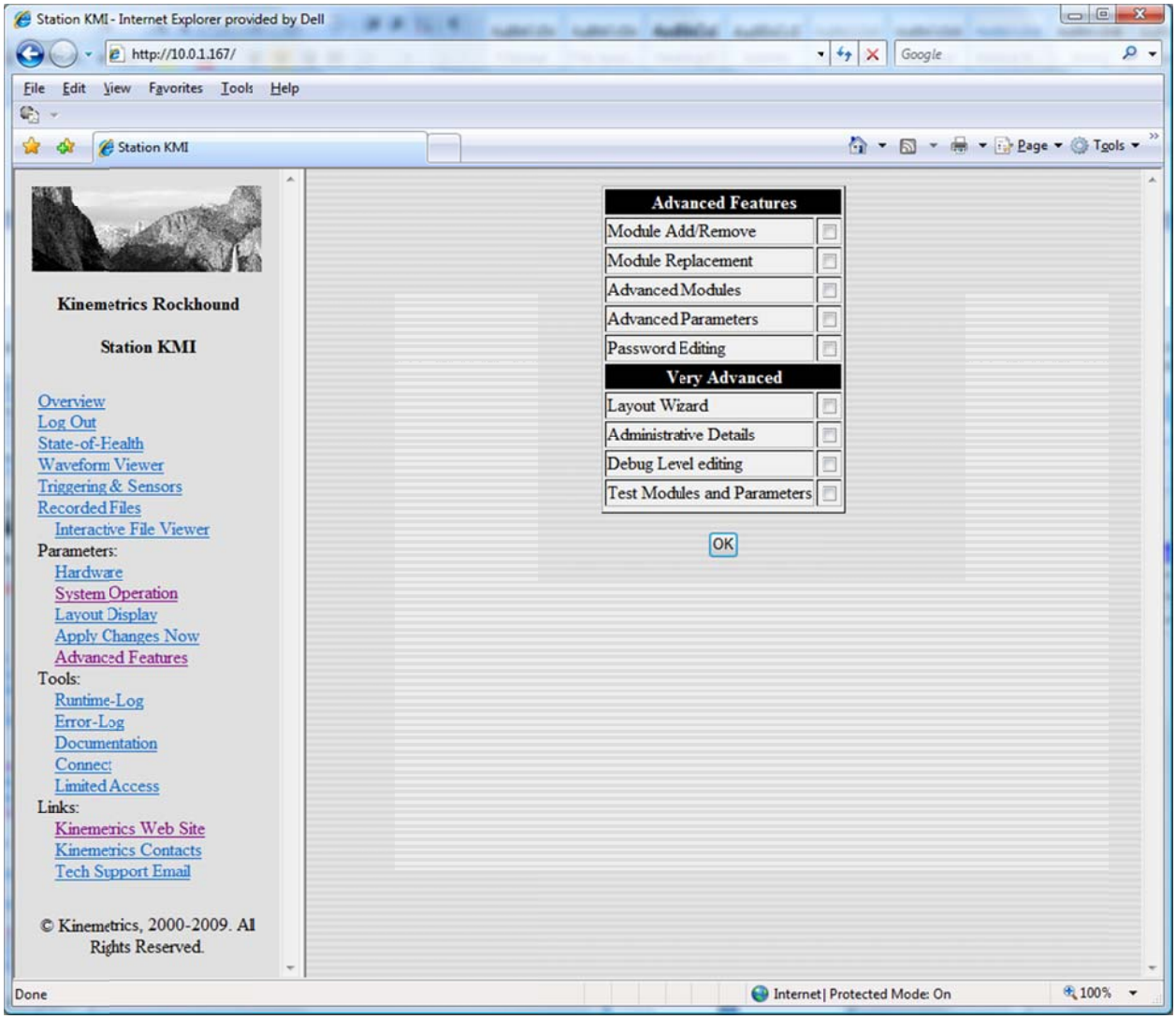
HTTPConfig module main page

The System Operation or Hardware parameters links will take you to a parameter editing screen such as:



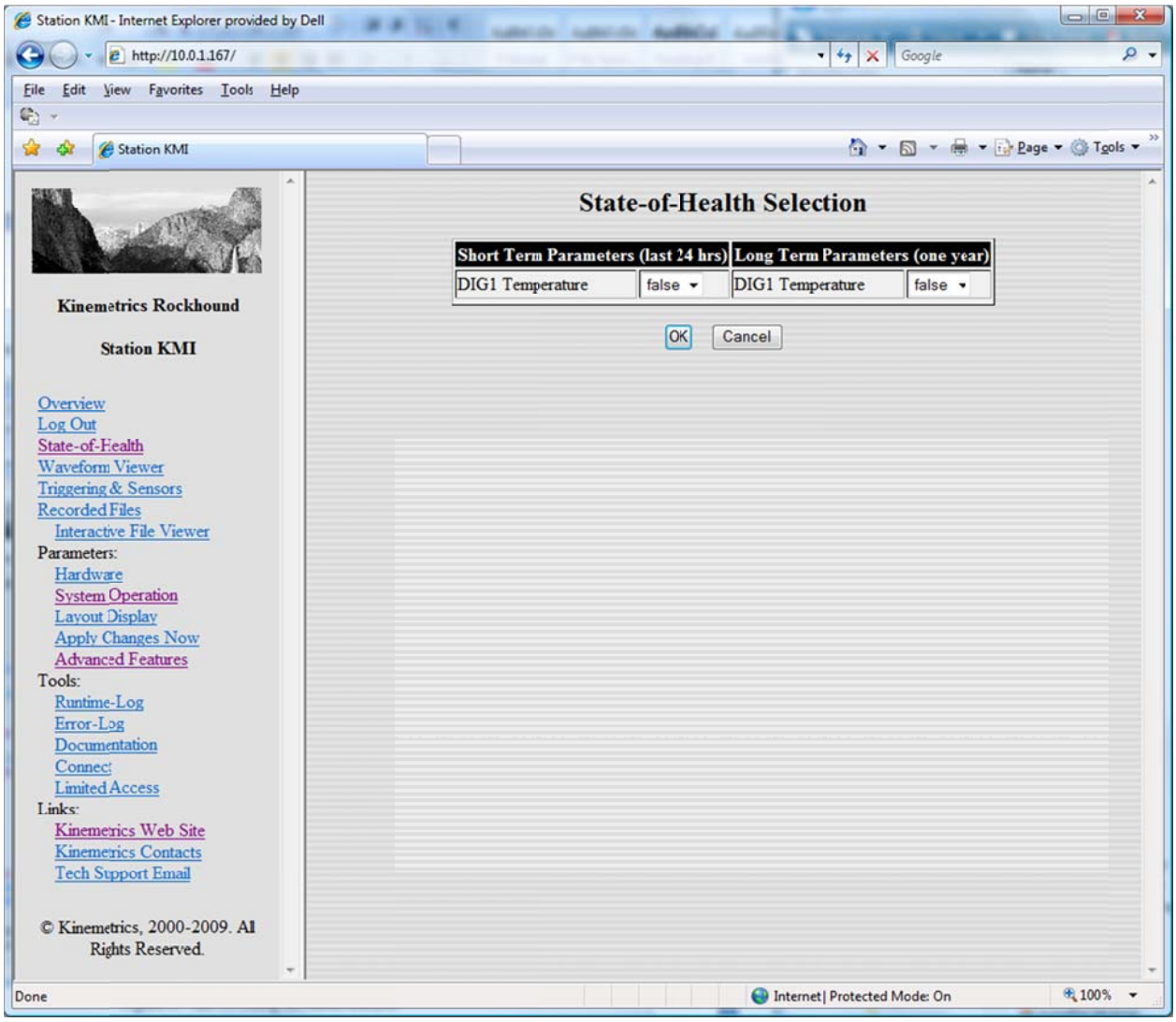
HTTPConfig operational parameters

Advanced features can be enabled to provide additional capabilities:



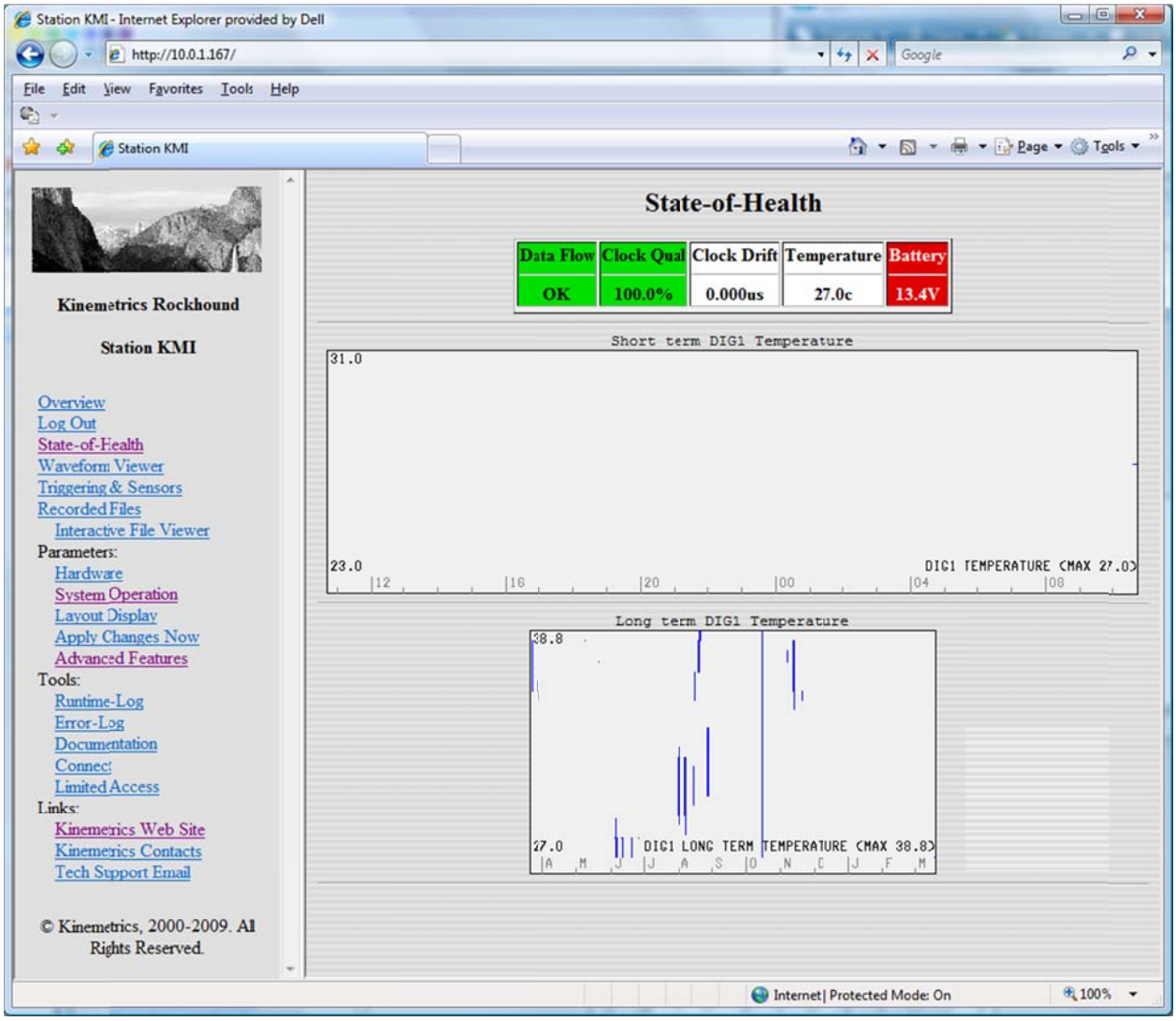
HTTPConfig advanced features

State-of-Health takes you to a selection screen (this data is for a Q330), which allows you to select those State-of-Health values that are of interest:



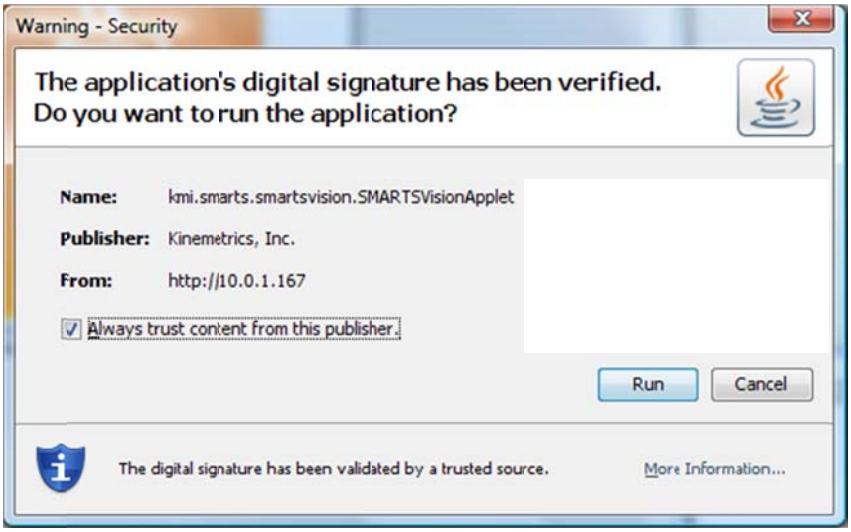
HTTPConfig state-of-health selection

Once selected, a state-of-health display will show the selected data as graphs. Available data can be shown as short term (last 24 hours) or long term (previous year):



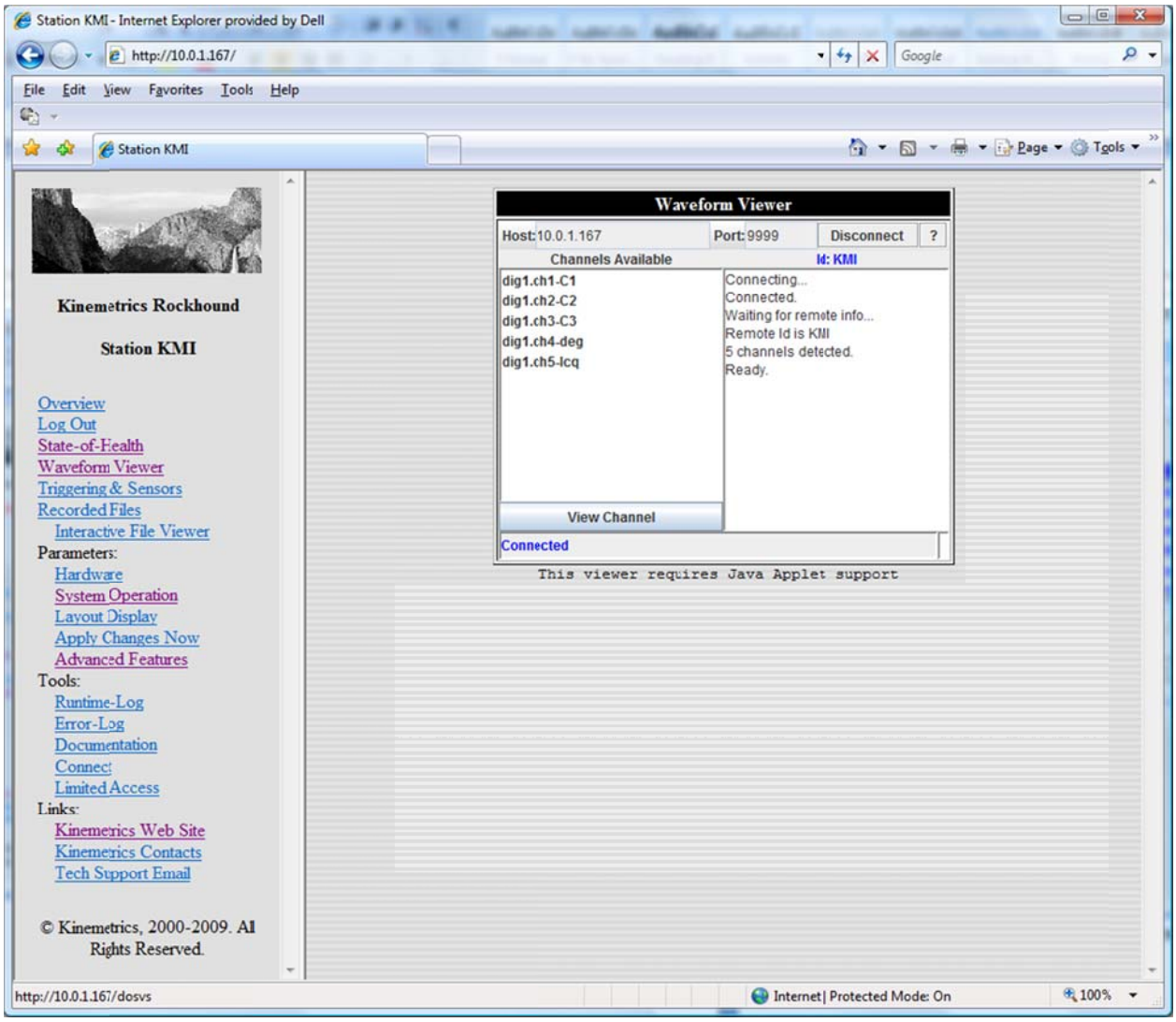
HTTPConfig state-of-health graphs

Waveform viewer will require that your user install Java. Once installed, the waveform viewer is provided as a signed Java applet, which is downloaded from Rockhound to the user's computer. He will get a security warning as follows:


Warning - Security
The application's digital signature has been verified.
Do you want to run the application?
Name: kmi.smarts.smartsvision.SMARTSVisionApplet
Publisher: Kinemetrics, Inc.
From: http://10.0.1.167
Always trust content from this publisher.
Run
Cancel
The digital signature has been validated by a trusted source.
More Information...

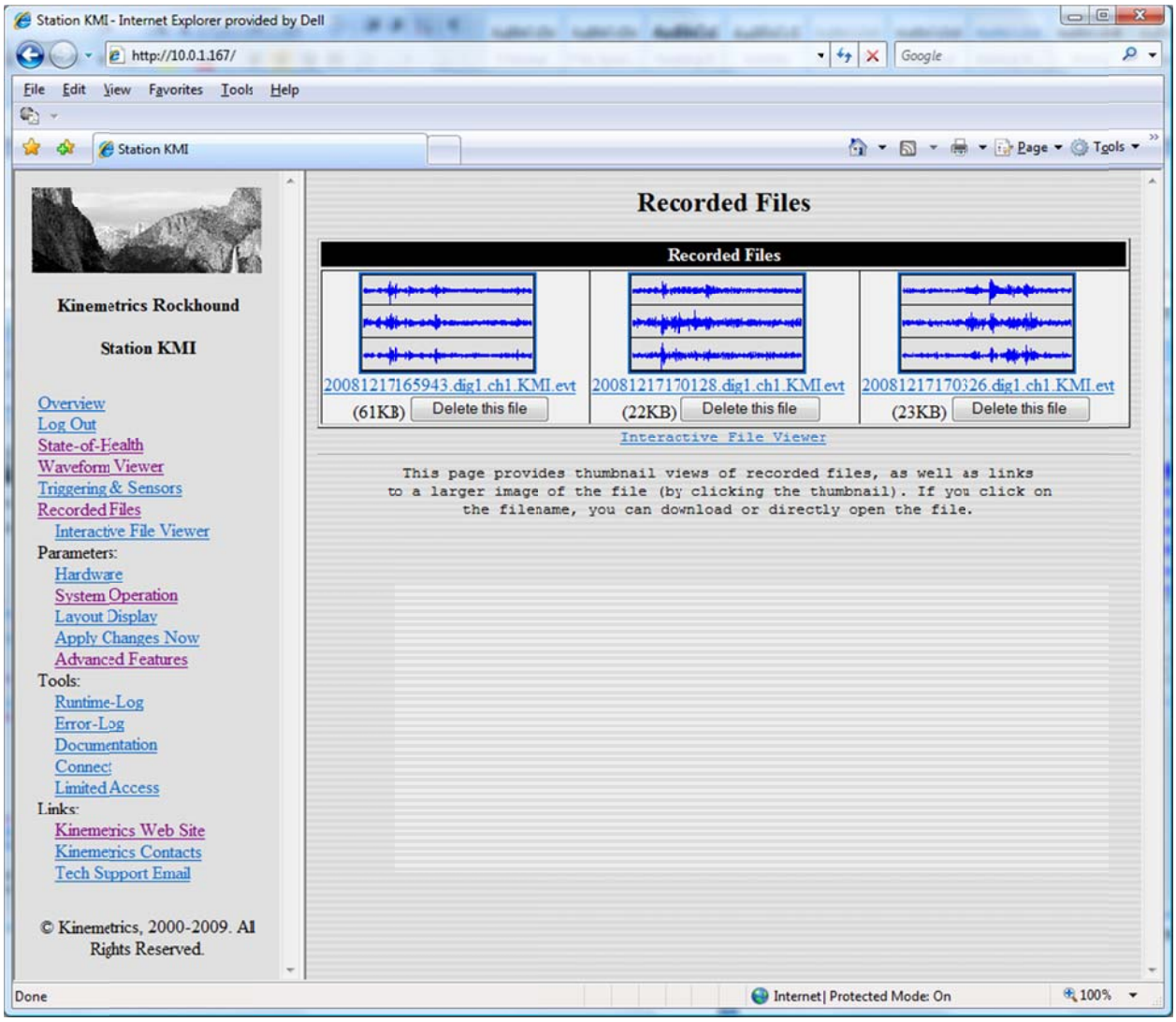
HTTPConfig security warning

Once selected, they will be presented with the ROCKVision viewer, but running as a Java applet rather than as an installed application:



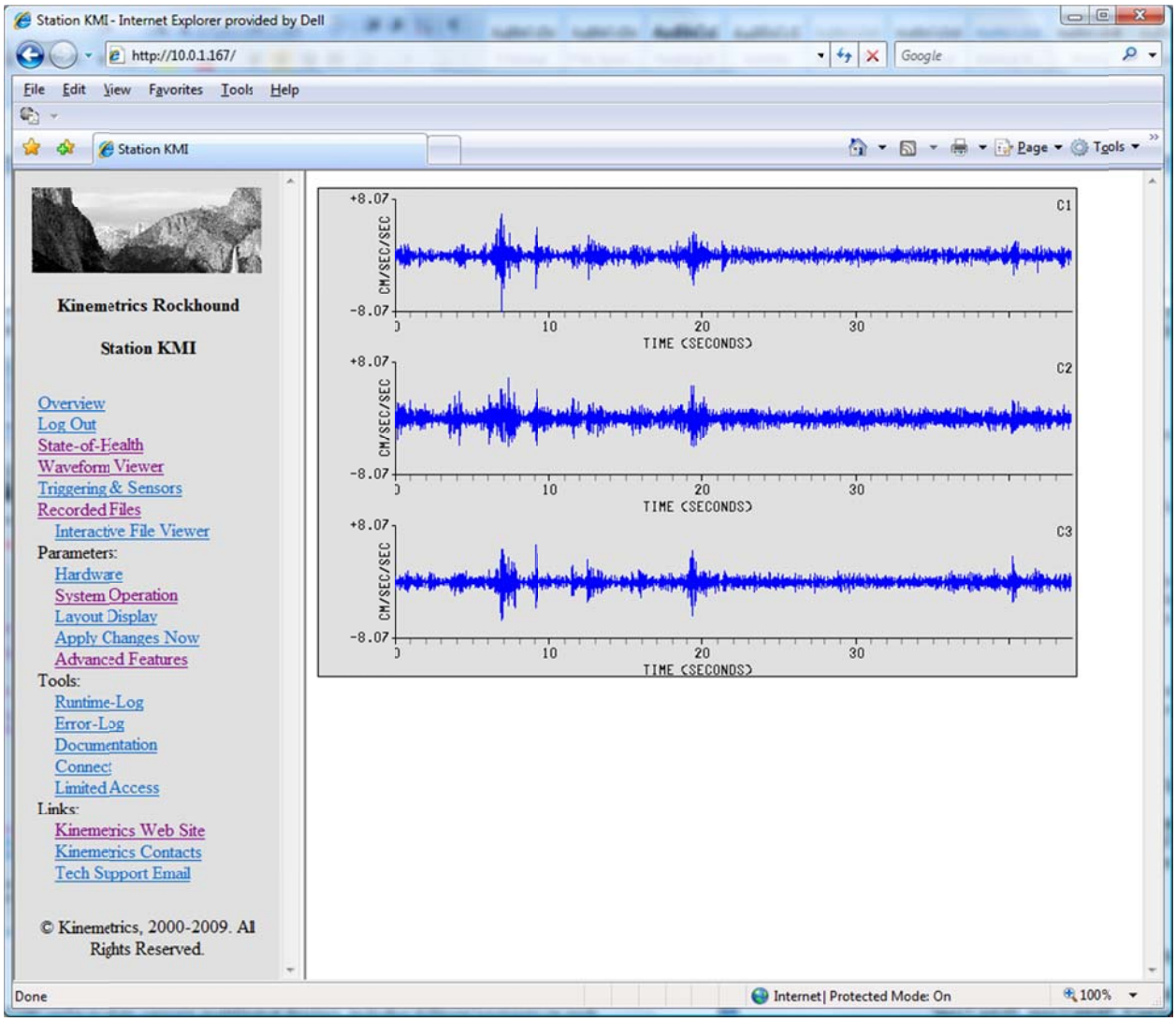
HTTPConfig ROCKVision Java applet

Recorded files will display all files recorded by Rockhound as thumbnail images. The images by nature are very small and download to your browser quickly. They allow you to determine which files are important enough to be downloaded and studied closer, and which are of no interest.



HTTPConfig Thumbnail images

If you click on the thumbnail, you will see a somewhat larger image of the file, as shown here. Clicking on the filename will download the file, which you can save as a file, or open directly with file viewing software that has been associated with that file type on your computer.



HTTPConfig Enlarged thumbnail image

The HTTPConfig module supports multilingual displays, including different languages on each connection. All HTTPConfig messages can be translated - but some messages from other parts of the Rockhound system may not be translatable. Translation is enabled by adding a file "httplanguages.cfg" to the SMARTSDist directory. The file contains common names of translations supported, and their corresponding language files. English is implied. Kinemetrics does not normally provide or maintain the translation files.

An example "httplanguages.cfg" file would look like this:

```
Spanish=spanish.cfg
German=german.cfg
```

By adding this file to the system, the user will be allowed to select the language translation at the time that user logon is completed. When the user selects the language (for example, Spanish), the language file "spanish.cfg" will be loaded for that connection. An example of the contents of the language file is as follows:

```
Yes=Si
Close=cerrar
```

Messages containing spaces or most special characters must be escaped using backslash as follows:

```
Very\ good=Muy\ bien
```

Special characters can be displayed by listing their character values. For example:

```
Tomorrow=Ma&\#241ana
```

In addition, the characters set used by the browser can also be replaced, so if characters are needed other than those specified in the standard Latin character set "iso-8859-1" to support, say Cyrillic, you can "translate" the character set designator to:

```
iso-8859-1=iso-8859-5
```

Messages that are not listed are displayed with their English equivalents, so "No" is displayed as "No" if not listed. A list of translatable messages is available from Kinemetrics. Category: HTTPSERVER
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

List of Administrator username/password pairs. Colons separate username and password, as follows: 'user1:pwd1, user2:pwd2'. Username and password are case sensitive and cannot contain special characters such as space, comma, colon or quotes. (Dynamic Parameter)
Name: AdminPasswords
Type: String
Range: 0 to 512 characters
Default: rock:kmi
Example: AdminPasswords=rock:kmi

List of Client username/password pairs. Colons separate username and password, as follows: 'user1:pwd1, user2:pwd2'. Username and password are case sensitive and cannot contain special characters such as space, comma, colon or quotes. (Dynamic Parameter)
Name: ClientPasswords
Type: String
Range: 0 to 512 characters
Default: none
Example: ClientPasswords=string

Create thumbnail displays for any newly recorded files for compatible data formats. NOTE: This feature will require additional processor time as well as storage space when files are created. It is not generally recommended for use with continuous recording. (Dynamic Parameter)
Name: Thumbnails
Type: boolean
Default: true
Example: Thumbnails=true

Size of generated plots if using thumbnails. Thumbnail images will be 1/4 the size of the generated image. (Dynamic Parameter)
Name: ThumbnailSize
Type: choice
Choices: 600,800
Default: 600
Example: ThumbnailSize=600

Units used for plotting thumbnails, if thumbnail file creation enabled. Note that g and cm selections only apply to accelerometers, and only if sensitivity selection is set correctly. (Dynamic Parameter)
Name: ThumbnailUnits
Type: choice
Choices: Full Scale,Volts,g,cm,gal
Default: cm
Example: ThumbnailUnits=cm

Put a contact link on the web page. DO NOT INCLUDE DOUBLE QUOTES. If used, set to a web page link such as 'www.kmi.com'. The keywords ^lat^, ^nlat^, ^lon^, ^nlon^, ^minlat^, ^minnlat^, ^maxlat^, ^maxnlat^, ^minlon^, ^minnlon^, ^maxlon^, ^maxnlon^ will be replaced if found with the current latitude and longitude. You can also specify the link name using this form: 'MyWebSite:www.mysite.com'. (Dynamic Parameter)
Name: ContactLink
Type: String
Range: 0 to 512 characters
Default: none
Example: ContactLink=string

Put a weather link on the web page. DO NOT INCLUDE DOUBLE QUOTES. If used, can point to a user-defined localized weather provider. If the link string starts with '<', then it is assumed to be embeddable HTML source such as a Weather.com widget. If you want no weather link, enter NONE here. (Dynamic Parameter)
Name: WeatherLink
Type: String
Range: 0 to 512 characters
Default: NONE
Example: WeatherLink=NONE

Put a map link on the web page. DO NOT INCLUDE DOUBLE QUOTES. If used, can point to a user-defined localized map provider such as Google Maps. If the link string starts with '<', then it is assumed to be embeddable HTML source. The keywords ^lat^, ^nlat^, ^lon^, ^nlon^, ^minlat^, ^minnlat^, ^maxlat^, ^maxnlat^, ^minlon^, ^minnlon^, ^maxlon^, ^maxnlon^ will be replaced if found with the current latitude and longitude. The default example uses Google Maps and the GPS coordinates. If you want no map link, enter NONE here. (Dynamic Parameter)
Name: MapLink
Type: String
Range: 0 to 512 characters
Default: maps.google.com/?q=^lat^,^lon^
Example: MapLink=maps.google.com/?q=^lat^,^lon^

Map range specified as degrees +/- latitude and degrees +/- longitude. Specified as lat:lon. Defaults to 5:5 (Dynamic Parameter)
Name: MapRange
Type: String
Range: 0 to 512 characters
Default: none
Example: MapRange=string

SSH tunneling mode. When enabled, supports creation of an SSH tunnel for access to the Rock. In this mode, all internal web links and applets are directed through the tunnel, and password editing is marked enabled. Ports that should be directed through the tunnel include ports 80, 9900, and 9999. The TCP secondary port must be set to match the port used on the host (PC) end of the tunnel.
Name: Tunnel
Type: boolean
Default: false
Example: Tunnel=false

TCP Secondary Port number for Java Applet access to the web server. May be needed with some AntiVirus programs that manipulate port 80. If left at port 80, then all HTTP traffic is treated the same, whether from a browser or from an applet. If using SSH tunneling, make this port match the port used on the host (PC) end of the tunnel.
Name: TCPSecondaryPort
Type: int
Range: 0 to 32767
Default: 80
Example: TCPSecondaryPort=80

Disable usage tips at login. When true, disables tool tips presented at login. NOTE: Tool tips do not actually require any additional user interface clicks. (Dynamic Parameter)
Name: NoTips
Type: boolean
Default: false
Example: NoTips=false

Color of the font used for table titles (at the top of the table). Default is #FFFFFF (white in RGB) (Advanced)
Name: TableTitleFontColor
Type: String
Range: 3 to 20 characters
Default: #FFFFFF
Example: TableTitleFontColor=#FFFFFF

Background color of the bar used for table titles (at the top of the table). Default is #000000 (black in RGB) (Advanced)
Name: TableTitleBarColor
Type: String
Range: 3 to 20 characters
Default: #000000
Example: TableTitleBarColor=#000000

Background color of table bodies. Default is #F0F0F0 (light gray in RGB) (Advanced)
Name: TableBackgroundColor
Type: String
Range: 3 to 20 characters
Default: #F0F0F0
Example: TableBackgroundColor=#F0F0F0

Font color used for text in tables. Default is #000000 (black in RGB) (Advanced)
Name: TableFontColor
Type: String
Range: 3 to 20 characters
Default: #000000
Example: TableFontColor=#000000

Page background color used for the left pane and some simpler pages. Default is #E0E0E0 (medium gray in RGB) (Advanced)
Name: PageBackgroundColor
Type: String
Range: 3 to 20 characters
Default: #E0E0E0
Example: PageBackgroundColor=#E0E0E0

Page font color used for page notes and titles. Default is #000000 (black in RGB) (Advanced)
Name: PageFontColor
Type: String
Range: 3 to 20 characters
Default: #000000
Example: PageFontColor=#000000

Alert font color used for alert messages. Default is #E00000 (red in RGB) (Advanced)
Name: AlertFontColor
Type: String
Range: 3 to 20 characters
Default: #E00000
Example: AlertFontColor=#E00000

Background image (GIF file) that will be used on the right-hand pane (Advanced)
Name: BackgroundImage
Type: String
Range: 1 to 512 characters
Default: background_stripe.gif
Example: BackgroundImage=background_stripe.gif

User-Agent string list for mobile phones. If the User-Agent string sent as part of the HTML header contains any of these strings, the device is assumed to be a mobile phone, which necessarily has a smaller screen and does not support Java. User-Agent strings are space separated. Strings are NOT case sensitive and cannot contain special characters such as space, comma, colon or quotes. (Advanced)
Name: PhoneAgent
Type: String
Range: 0 to 512 characters
Default: palmsource netfront phone nokia symbian iemobile blackberry mini
Example: PhoneAgent=palmsource netfront phone nokia symbian iemobile blackberry mini

Allow limited access level users to have access to the Waveform Viewer. Note: Since only one user has access to the Waveform Viewer at a time, by enabling this you are potentially allowing limited access users to force full access users out of the Waveform Viewer without their permission. (Advanced) (Dynamic Parameter)
Name: WFVLimited
Type: boolean
Default: false
Example: WFVLimited=false

TCP Port number for the web server, usually 80 (Advanced)
Name: TCPPort
Type: int
Range: 0 to 32767
Default: 80
Example: TCPPort=80

Telemetry connections

Category: TELEMETRY

Telemetry modules provide a way to deliver data to a telemetry connection for the purpose of delivering the data to an alternate site instead of, or in addition to local processing.

The telemetry module may take the form of support for a customer-specific communications protocol interface, or may be as simple as the Rockhound Telemetry Connection module, which provides for easy viewing of Rockhound data from a remote site using ROCKTalk or a similar program.

Waveform viewer

The Telemetry Connection module is used to provide a telemetry interface that allows viewing of Rockhound data remotely using ROCKTalk or a similarly enabled program. The Telemetry Connection requires low processor overhead when the telemetry connection is not in use, since very little processing is required until the connection is open.

The Telemetry Connection makes all channels of data available to an outside connection for the purpose of monitoring the waveforms of the data flowing through Rockhound. This "quick check" can answer many questions as to the state of health of the equipment involved.

A Telemetry Connection is added to Rockhound layouts by default, but can be deleted by the user if necessary.

More data on the uses of the Telemetry Connection are included in the ROCKTalk Waveform Viewer Window section of this manual.

Category: TELEMETRY
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or CHANNELOASISBRIDGE_Output
and/or DATAINTEGRATOR_Output

Parameters added to module specific .cfg file:

TCP Port number for the telemetry connection, should be greater than 5000
Name: TCPPort
Type: int
Range: 5000 to 32767
Default: 9999
Example: TCPPort=9999

If selected, displays waveforms as blue on white rather than green on black (Dynamic Parameter)
Name: Negative
Type: boolean
Default: false
Example: Negative=false

Allows display of real-time FFT and/or PSD (Dynamic Parameter)
Name: RealTimeFFT
Type: boolean
Default: false
Example: RealTimeFFT=false

If selected, displays waveforms in a single large pane rather than in individual panes (Dynamic Parameter)
Name: SinglePane
Type: boolean
Default: true
Example: SinglePane=true

Maximum number of telemetry channels. NOTE! Be careful increasing this number on systems running large numbers of channels at high sample rates! (Advanced)
Name: MaxTxChannels
Type: int
Range: 1 to 500
Default: 24
Example: MaxTxChannels=24

Data Relay to transmit data stream

Category: DATARELAY

Data Relay modules are intended to retransmit the data from the Rockhound system to another device or computer. Typically, these Data Relay modules are specific to a particular piece of hardware and may be written by the end user or a third party developer as part of a specific project.

DFS Telemetry (Advanced)

The DFS Telemetry module outputs data from up to three channels to an RS-232 port using the 16 bit IASPEI DFS format. This module can be useful when integrating a Rockhound based data collection system with an existing DFS-enabled system, and can also be used to interface with existing peripheral hardware that supports DFS such as Kelunji drum recorders.

Note that timing is only as good as the available computer time and operating system allow. The module attempts to regulate timing within these capabilities to provide regularly timed output. Using the highest baud rates possible and a reasonably sized transmission latency buffer will help improve timing. The latency buffer is required because there may be transmission delays associated with receiving the data from the digitizers and a buffer helps to smooth out the DFS output timing and avoid large timing gaps.

Configuration parameters are available that include communication parameters, final output sample rate, selected channels, minimum latency value (the telemetry buffer), and whether or not time packets must be output.

Notes related to interfacing a Kelunji drum recorder:

- Baud rate: Must match the expected baud rate of the Kelunji telemetry port
- Port Parameters: Typically 8N1N
- Output Rate: Must match the expected sample rate of the drum recorder
- Channels: Must be a list of three channels. The Telemetry Channel selection within the drum recorder will select between the three.
- Minimum Latency: This value should be set to a value smaller than the Telemetry Delay selection within the drum recorder. Exact values necessary will depend on network conditions, but good starting values are 10 for the drum recorder's Telemetry Delay value and 5 for the DFS Telemetry module's Minimum Latency value.
- Time Packets: Should be enabled
- The drum recorder's Scale Factor parameter may be used to scale output.

NOTE: The drum recorder has a time window that is used to validate the timestamps of incoming data. Data that does not fall within this time window will be discarded, and you'll get a flat line. For this reason it is important that the time base of the drum recorder and the data source be the same - ideally both from GPS relative to UTC. The drum recorder's Telemetry Delay parameter must be large enough to comfortably include the DFS Telemetry module's Minimum Latency value.

Category: DATARELAY
Publishes: Output
Subscribes to: DATAINTEGRATOR_Output

Parameters added to module specific .cfg file:

Name of the DFS port, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: PortName
Type: String
Range: 1 to 20 characters
Default: /dev/ttyS1
Example: PortName=/dev/ttyS1

Baud rate used for communication
Name: BaudRate
Type: choice
Choices: 4800,9600,19200,38400,57600
Default: 19200
Example: BaudRate=19200

Output sample rate of DFS data. Must divide evenly into the sample rate of the input data. The sample rate of all input data AND channels must be the same.
Name: OutputRate
Type: int
Range: 1 to 1000
Default: 100
Example: OutputRate=100

List of digitizers: channels to be relayed, e.g. 'dig1:1, dig1:2'
Name: Channels
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channels=string

Specifies minimum latency of the DFS output. Because DFS is sent without flow control, it is important to allow for delays in transmission so there are not gaps in the DFS output. Suggested setting is 5 seconds, but varies according to network conditions.
Name: MinLatency
Type: int
Range: 1 to 1000
Default: 5
Example: MinLatency=5

Time packets required as for Kelunji drum recorder. This is an optional packet within the IASPEI DFS protocol.
Name: TimePackets
Type: boolean
Default: false
Example: TimePackets=false

Parameters used to set up basic port parameters such as bits, parity, stop bits and flow control (Advanced)
Name: PortParams
Type: String
Range: 1 to 20 characters
Default: 8n1n
Example: PortParams=8n1n

SVDR Telemetry (Advanced)

Module name: SVDRTelemetry This module is used to send selected channels of the data stream to a PC-based DAC board for driving a Kinemetrics analog drum recorder. Specifically, the board used is the Omega OME-PIO-DA series.

This module can only be used in a PC equipped with the appropriate hardware, and requires separate registration.

Note that this feature has a separate user manual, p/n 302481.

Category: DATARELAY
Publishes: Output
Subscribes to: DATAINTEGRATOR_Output

Parameters added to module specific .cfg file:

Channel source, e.g. 'dig1:2'
Name: Channel1
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel1=string

Gain factor (multiplier) for output data
Name: Gain1
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain1=1

Channel source, e.g. 'dig1:2'
Name: Channel2
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel2=string

Gain factor (multiplier) for output data
Name: Gain2
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain2=1

Channel source, e.g. 'dig1:2'
Name: Channel3
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel3=string

Gain factor (multiplier) for output data
Name: Gain3
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain3=1

Channel source, e.g. 'dig1:2'
Name: Channel4
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel4=string

Gain factor (multiplier) for output data
Name: Gain4
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain4=1

Channel source, e.g. 'dig1:2'
Name: Channel5
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel5=string

Gain factor (multiplier) for output data
Name: Gain5
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain5=1

Channel source, e.g. 'dig1:2'
Name: Channel6
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel6=string

Gain factor (multiplier) for output data
Name: Gain6
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain6=1

Channel source, e.g. 'dig1:2'
Name: Channel7
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel7=string

Gain factor (multiplier) for output data
Name: Gain7
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain7=1

Channel source, e.g. 'dig1:2'
Name: Channel8
Type: String
Range: 0 to 1024 characters
Default: none
Example: Channel8=string

Gain factor (multiplier) for output data
Name: Gain8
Type: double
Range: 0.125 to 4096
Default: 1
Example: Gain8=1

Full scale DAC output value, in volts. This is used for all channels. Use individual channel gains to set specific scaling values.
Name: DrumFS
Type: double
Range: 0.25 to 10
Default: 5
Example: DrumFS=5

Remove mean from signals before output
Name: MeanRemove
Type: boolean
Default: false
Example: MeanRemove=false

Altus Telemetry via RS-232

This module provides support for limited emulation of the Altus RS232 interface, including the Serial Data Streams (SDS) protocol, modem dial-out modes and command console. The primary purpose of this module is to allow customers with existing Altus units and software that communicates with them to have an easier transition requiring little or no software changes before eventual conversion to a more native interface.

Communication parameters and conditions are controlled through Rockhound parameters, and this class will support a very limited subset of the Altus command mode and block mode functions. Parameters can be read through the interface via an SDS parameter packet, but parameters cannot be sent back as a parameter packet. Block mode file transfers are supported.

Command mode supports a very limited command set, but does include most file operations, including TX and RX commands.

Altus modem modes are nearly fully supported.

Category: DATARELAY
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or DATAINTEGRATOR_Output

Parameters added to module specific .cfg file:

COM port specification, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: ComPort
Type: String
Range: 1 to 80 characters
Default: /dev/ttyS1
Example: ComPort=/dev/ttyS1

Serial baud rate
Name: Baud
Type: choice
Choices: 2400,4800,9600,19200,38400,57600
Default: 57600
Example: Baud=57600

Enable use of a secondary Rock platform serial port. PLEASE NOTE THAT THIS IS STRONGLY DISCOURAGED if the modem will be the only remote connection to the Rock, as a firmware or parameter problem could make the unit inaccessible remotely. If the modem is the only remote connection to the Rock, we recommend that you instead configure the TTY Monitor service via the ttymonconfig script from Linux, and then replace this module with the 'Altus Telemetry via TCP/IP' module and configure it to connect to the service at the specified port. Using the service will allow you to get emergency access to a Linux shell through the modem if needed. If this is a secondary connection, or you are willing to take the risk of not being able to access the unit remotely in case of problems, then select this options to define this as a secondary connection.
Name: RockSecondary
Type: boolean
Default: false
Example: RockSecondary=false

Altus password feature to block use of certain commands (Dynamic Parameter)
Name: Password
Type: String
Range: 0 to 80 characters
Default: none
Example: Password=string

List of digitizers:channels to be output, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

Enable modem use. When disabled, the connection is permanent and there's no dialing or modem control
Name: ModemEnable
Type: boolean
Default: true
Example: ModemEnable=true

Dial on triggered event if modem enabled (Dynamic Parameter)
Name: OnEvent
Type: boolean
Default: true
Example: OnEvent=true

Dial on daily checkin if modem enabled (Dynamic Parameter)
Name: OnCheckin
Type: boolean
Default: false
Example: OnCheckin=false

Dial on alarm activation if modem enabled (Dynamic Parameter)
Name: OnAlarm
Type: boolean
Default: false
Example: OnAlarm=false

Dial on loss of AC input if modem enabled (Dynamic Parameter)
Name: OnLostAC
Type: boolean
Default: false
Example: OnLostAC=false

Dial on low battery (less than 12VDC) if modem enabled (Dynamic Parameter)
Name: OnLowBatt
Type: boolean
Default: false
Example: OnLowBatt=false

Dial on loss of GPS (less than 80% clock quality) if modem enabled (Dynamic Parameter)
Name: OnLostGPS
Type: boolean
Default: false
Example: OnLostGPS=false

Dial on extreme temperature (less than -20c or more than +65c) if modem enabled (Dynamic Parameter)
Name: OnExtTemp
Type: boolean
Default: false
Example: OnExtTemp=false

Call must complete with an 'ANS' command in order for the call to be considered successful, else will retry the call. (Dynamic Parameter)
Name: CallCompletion
Type: boolean
Default: true
Example: CallCompletion=true

Modem initialization string (Dynamic Parameter)
Name: ModemSetupCmd
Type: String
Range: 0 to 40 characters
Default: AT&FL1E0&C1S0=1&W
Example: ModemSetupCmd=AT&FL1E0&C1S0=1&W

Modem Dialing prefix (Dynamic Parameter)
Name: ModemDialCmd
Type: String
Range: 0 to 40 characters
Default: ATDT
Example: ModemDialCmd=ATDT

Modem hangup string (Dynamic Parameter)
Name: ModemHangupCmd
Type: String
Range: 0 to 40 characters
Default: ATH
Example: ModemHangupCmd=ATH

Phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber1
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber1=string

Alternate phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber2
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber2=string

Time of daily checkin in hours:minutes (00:00 - 23:59) (Dynamic Parameter)
Name: DailyCKITime
Type: String
Range: 0 to 5 characters
Default: none
Example: DailyCKITime=string

Daily checkin interval (0=Daily, 1=Skip one day) (Dynamic Parameter)
Name: DailyCKIDays
Type: int
Range: 0 to 15
Default: 0
Example: DailyCKIDays=0

Time to wait for a connection to the data center, in seconds (Dynamic Parameter)
Name: ConnectWait
Type: int
Range: 5 to 400
Default: 30
Example: ConnectWait=30

Count of number of retries before giving up on a call (Dynamic Parameter)
Name: RetryCount
Type: int
Range: 1 to 1000
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds (Dynamic Parameter)
Name: RetryDelaySec
Type: int
Range: 1 to 3600
Default: 30
Example: RetryDelaySec=30

Maximum delay between retries as retry interval is doubled, in seconds (Dynamic Parameter)
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

Space separated times of day (2:15 15:54) to allow call in. This allows modem power to be turned on to allow call in at predictable times (Dynamic Parameter)
Name: CallWindows
Type: String
Range: 0 to 40 characters
Default: none
Example: CallWindows=string

Length of call window in minutes. -2=Unused, -1=Power always on, 0=No call-in power, X=minutes. Note that power bit is defined in the Rock GPIO module (Dynamic Parameter)
Name: WindowDuration
Type: int
Range: -2 to 240
Default: -2
Example: WindowDuration=-2

Warmup time in seconds after power is turned on, but before call is attempted. Power remains on for 2 seconds after completion of the call (Dynamic Parameter)
Name: WindowWarmup
Type: int
Range: 0 to 900
Default: 0
Example: WindowWarmup=0

Difference compression of the data stream
Name: Compress
Type: boolean
Default: true
Example: Compress=true

Buffer size of the simulated Altus ring buffer in 16kb blocks (64 = 1mb). Zero (0) means no streaming. NOTE: Will be disabled if modem functions used!
Name: Buffer
Type: int
Range: 0 to 65535
Default: 0
Example: Buffer=0

Primarily for use with Altus EVT archiver. Simulates the Altus naming convention by creating new EVT files with the naming style AA001.EVT. Applies ONLY to event recording. Continuously recorded data is produced in the YYYYMMDDHHMMSS.firstCh.STDID.evt format only. (Advanced) (Dynamic Parameter)
Name: AltusEVTStyle
Type: boolean
Default: true
Example: AltusEVTStyle=true

Dynamic packet sizing allows automatic sizing of packets for block file transfers to maximize transmission speed. If disabled, packets are fixed at 256 bytes. (Advanced)
Name: TXSize256
Type: choice
Choices: 0-Dynamic 2048,1-Fixed 256,2-Dynamic 4096
Default: 0-Dynamic 2048
Example: TXSize256=0-Dynamic 2048

Maximum size for RAM-based SDS ring buffer in KB. Above this number, the ring buffer is created on disk. (Advanced)
Name: SDSMaxRam
Type: int
Range: 0 to 64000
Default: 4000
Example: SDSMaxRam=4000

Mode 2 timeout value in packets. 0=Mode 1 (normal), -1=Mode 3 (handshake), 6-65535=Mode 2 (periodic continuations required) (Advanced)
Name: ModeTimeout
Type: int
Range: -1 to 65535
Default: 0
Example: ModeTimeout=0

Advanced serial port settings for data bits, parity, etc. (Default is 8 bits, no parity, 1 stop bit) (Advanced)
Name: ComSettings
Type: String
Range: 0 to 20 characters
Default: none
Example: ComSettings=string

Altus Telemetry via TCP/IP

This module provides support for limited emulation of the Altus TCP/IP interface, including the Serial Data Streams (SDS) protocol, modem dial-out modes and command console. The primary purpose of this module is to allow customers with existing Altus units and software that communicates with them to have an easier transition requiring little or no software changes before eventual conversion to a more native interface.

Communication parameters and conditions are controlled through Rockhound parameters, and this class will support a very limited subset of the Altus command mode and block mode functions. Parameters can be read through the interface via an SDS parameter packet, but parameters cannot be sent back as a parameter packet. Block mode file transfers are supported.

Command mode supports a very limited command set, but does include most file operations, including TX and RX commands.

Altus modem modes are nearly fully supported.

Category: DATARELAY
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or DATAINTEGRATOR_Output

Parameters added to module specific .cfg file:

TCP Port number for outgoing data, should be greater than 5000
Name: TCPPort
Type: int
Range: 5000 to 32767
Default: 9800
Example: TCPPort=9800

Altus password feature to block use of certain commands (Dynamic Parameter)
Name: Password
Type: String
Range: 0 to 80 characters
Default: none
Example: Password=string

List of digitizers:channels to be output, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

Enable modem use. When disabled, the connection is permanent and there's no dialing or modem control
Name: ModemEnable
Type: boolean
Default: false
Example: ModemEnable=false

Dial on triggered event if modem enabled (Dynamic Parameter)
Name: OnEvent
Type: boolean
Default: false
Example: OnEvent=false

Dial on daily checkin if modem enabled (Dynamic Parameter)
Name: OnCheckin
Type: boolean
Default: false
Example: OnCheckin=false

Dial on alarm activation if modem enabled (Dynamic Parameter)
Name: OnAlarm
Type: boolean
Default: false
Example: OnAlarm=false

Dial on loss of AC input if modem enabled (Dynamic Parameter)
Name: OnLostAC
Type: boolean
Default: false
Example: OnLostAC=false

Dial on low battery (less than 12VDC) if modem enabled (Dynamic Parameter)
Name: OnLowBatt
Type: boolean
Default: false
Example: OnLowBatt=false

Dial on loss of GPS (less than 80% clock quality) if modem enabled (Dynamic Parameter)
Name: OnLostGPS
Type: boolean
Default: false
Example: OnLostGPS=false

Dial on extreme temperature (less than -20c or more than +65c) if modem enabled (Dynamic Parameter)
Name: OnExtTemp
Type: boolean
Default: false
Example: OnExtTemp=false

Call must complete with an 'ANS' command in order for the call to be considered successful, else will retry the call. (Dynamic Parameter)
Name: CallCompletion
Type: boolean
Default: false
Example: CallCompletion=false

Modem initialization string. Unused on a Rock and is instead specified by the TTY Monitor Service. If needed, use ttymonconfig from Linux to configure this service. (Dynamic Parameter)
Name: ModemSetupCmd
Type: String
Range: 0 to 40 characters
Default: AT&FL1E0&C1S0=1&W
Example: ModemSetupCmd=AT&FL1E0&C1S0=1&W

Modem Dialing prefix (Dynamic Parameter)
Name: ModemDialCmd
Type: String
Range: 0 to 40 characters
Default: ATDT
Example: ModemDialCmd=ATDT

Modem hangup string (Dynamic Parameter)
Name: ModemHangupCmd
Type: String
Range: 0 to 40 characters
Default: ATH
Example: ModemHangupCmd=ATH

Phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber1
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber1=string

Alternate phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber2
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber2=string

Time of daily checkin in hours:minutes (00:00 - 23:59) (Dynamic Parameter)
Name: DailyCKITime
Type: String
Range: 0 to 5 characters
Default: none
Example: DailyCKITime=string

Daily checkin interval (0=Daily, 1=Skip one day) (Dynamic Parameter)
Name: DailyCKIDays
Type: int
Range: 0 to 15
Default: 0
Example: DailyCKIDays=0

Time to wait for a connection to the data center, in seconds (Dynamic Parameter)
Name: ConnectWait
Type: int
Range: 5 to 400
Default: 30
Example: ConnectWait=30

Count of number of retries before giving up on a call (Dynamic Parameter)
Name: RetryCount
Type: int
Range: 1 to 1000
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds (Dynamic Parameter)
Name: RetryDelaySec
Type: int
Range: 1 to 3600
Default: 30
Example: RetryDelaySec=30

Maximum delay between retries as retry interval is doubled, in seconds (Dynamic Parameter)
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

Space separated times of day (2:15 15:54) to allow call in. This allows modem power to be turned on to allow call in at predictable times (Dynamic Parameter)
Name: CallWindows
Type: String
Range: 0 to 40 characters
Default: none
Example: CallWindows=string

Length of call window in minutes. -2=Unused, -1=Power always on, 0=No call-in power, X=minutes. Note that power bit is defined in the Rock GPIO module (Dynamic Parameter)
Name: WindowDuration
Type: int
Range: -2 to 240
Default: -2
Example: WindowDuration=-2

Warmup time in seconds after power is turned on, but before call is attempted. Power remains on for 2 seconds after completion of the call (Dynamic Parameter)
Name: WindowWarmup
Type: int
Range: 0 to 900
Default: 0
Example: WindowWarmup=0

Difference compression of the data stream
Name: Compress
Type: boolean
Default: true
Example: Compress=true

Buffer size of the simulated Altus ring buffer in 16kb blocks (64 = 1mb). Zero (0) means no streaming. NOTE: Will be disabled if modem functions used!
Name: Buffer
Type: int
Range: 0 to 65535
Default: 64
Example: Buffer=64

Primarily for use with Altus EVT archiver. Simulates the Altus naming convention and archiver bit by creating new EVT files with the naming style AA001.EVT. Applies ONLY to event recording. Continuously recorded data is produced in the YYYYMMDDHHMMSS.firstCh.STDID.evt format only. (Advanced) (Dynamic Parameter)
Name: AltusEVTStyle
Type: boolean
Default: true
Example: AltusEVTStyle=true

Dynamic packet sizing allows automatic sizing of packets for block file transfers to maximize transmission speed. If disabled, packets are fixed at 256 bytes. (Advanced)
Name: TXSize256
Type: choice
Choices: 0-Dynamic 2048,1-Fixed 256,2-Dynamic 4096
Default: 0-Dynamic 2048
Example: TXSize256=0-Dynamic 2048

Maximum size for RAM-based SDS ring buffer in KB. Above this number, the ring buffer is created on disk. (Advanced)
Name: SDSMaxRam
Type: int
Range: 0 to 64000
Default: 4000
Example: SDSMaxRam=4000

Mode 2 timeout value in packets. 0=Mode 1 (normal), -1=Mode 3 (handshake), 6-65535=Mode 2 (periodic continuations required) (Advanced)
Name: ModeTimeout
Type: int
Range: -1 to 65535
Default: 0
Example: ModeTimeout=0

CGS Altus Telemetry via RS-232

This module provides support for limited emulation of the Altus RS232 interface, including the Serial Data Streams (SDS) protocol, modem dial-out modes and command console. The primary purpose of this module is to allow customers with existing Altus units and software that communicates with them to have an easier transition requiring little or no software changes before eventual conversion to a more native interface.

Communication parameters and conditions are controlled through Rockhound parameters, and this class will support a very limited subset of the Altus command mode and block mode functions. Parameters can be read through the interface via an SDS parameter packet, but parameters cannot be sent back as a parameter packet. Block mode file transfers are supported.

Command mode supports a very limited command set, but does include most file operations, including TX and RX commands.

This module adds CGS specific support for the HOLD and SUCCESS commands.

Altus modem modes are nearly fully supported.

Category: DATARELAY
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or DATAINTEGRATOR_Output

Parameters added to module specific .cfg file:

COM port specification, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: ComPort
Type: String
Range: 1 to 80 characters
Default: /dev/ttyS1
Example: ComPort=/dev/ttyS1

Serial baud rate
Name: Baud
Type: choice
Choices: 2400,4800,9600,19200,38400,57600
Default: 57600
Example: Baud=57600

Enable use of a secondary Rock platform serial port. PLEASE NOTE THAT THIS IS STRONGLY DISCOURAGED if the modem will be the only remote connection to the Rock, as a firmware or parameter problem could make the unit inaccessible remotely. If the modem is the only remote connection to the Rock, we recommend that you instead configure the TTY Monitor service via the ttymonconfig script from Linux, and then replace this module with the 'Altus Telemetry via TCP/IP' module and configure it to connect to the service at the specified port. Using the service will allow you to get emergency access to a Linux shell through the modem if needed. If this is a secondary connection, or you are willing to take the risk of not being able to access the unit remotely in case of problems, then select this options to define this as a secondary connection.
Name: RockSecondary
Type: boolean
Default: false
Example: RockSecondary=false

Altus password feature to block use of certain commands (Dynamic Parameter)
Name: Password
Type: String
Range: 0 to 80 characters
Default: none
Example: Password=string

List of digitizers:channels to be output, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

Enable modem use. When disabled, the connection is permanent and there's no dialing or modem control
Name: ModemEnable
Type: boolean
Default: true
Example: ModemEnable=true

Dial on triggered event if modem enabled (Dynamic Parameter)
Name: OnEvent
Type: boolean
Default: true
Example: OnEvent=true

Dial on daily checkin if modem enabled (Dynamic Parameter)
Name: OnCheckin
Type: boolean
Default: false
Example: OnCheckin=false

Dial on alarm activation if modem enabled (Dynamic Parameter)
Name: OnAlarm
Type: boolean
Default: false
Example: OnAlarm=false

Dial on loss of AC input if modem enabled (Dynamic Parameter)
Name: OnLostAC
Type: boolean
Default: false
Example: OnLostAC=false

Dial on low battery (less than 12VDC) if modem enabled (Dynamic Parameter)
Name: OnLowBatt
Type: boolean
Default: false
Example: OnLowBatt=false

Dial on loss of GPS (less than 80% clock quality) if modem enabled (Dynamic Parameter)
Name: OnLostGPS
Type: boolean
Default: false
Example: OnLostGPS=false

Dial on extreme temperature (less than -20c or more than +65c) if modem enabled (Dynamic Parameter)
Name: OnExtTemp
Type: boolean
Default: false
Example: OnExtTemp=false

Call must complete with a 'SUCCESS' command in order for the call to be considered successful, else will retry the call. (Dynamic Parameter)
Name: CallCompletion
Type: boolean
Default: true
Example: CallCompletion=true

Modem initialization string (Dynamic Parameter)
Name: ModemSetupCmd
Type: String
Range: 0 to 40 characters
Default: AT&FL1E0&C1S0=1&W
Example: ModemSetupCmd=AT&FL1E0&C1S0=1&W

Modem Dialing prefix (Dynamic Parameter)
Name: ModemDialCmd
Type: String
Range: 0 to 40 characters
Default: ATDT
Example: ModemDialCmd=ATDT

Modem hangup string (Dynamic Parameter)
Name: ModemHangupCmd
Type: String
Range: 0 to 40 characters
Default: ATH
Example: ModemHangupCmd=ATH

Phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber1
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber1=string

Alternate phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber2
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber2=string

Time of daily checkin in hours:minutes (00:00 - 23:59) (Dynamic Parameter)
Name: DailyCKITime
Type: String
Range: 0 to 5 characters
Default: none
Example: DailyCKITime=string

Daily checkin interval (0=Daily, 1=Skip one day) (Dynamic Parameter)
Name: DailyCKIDays
Type: int
Range: 0 to 15
Default: 0
Example: DailyCKIDays=0

Time to wait for a connection to the data center, in seconds (Dynamic Parameter)
Name: ConnectWait
Type: int
Range: 5 to 400
Default: 30
Example: ConnectWait=30

Count of number of retries before giving up on a call (Dynamic Parameter)
Name: RetryCount
Type: int
Range: 1 to 1000
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds (Dynamic Parameter)
Name: RetryDelaySec
Type: int
Range: 1 to 3600
Default: 30
Example: RetryDelaySec=30

Maximum delay between retries as retry interval is doubled, in seconds (Dynamic Parameter)
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

Space separated times of day (2:15 15:54) to allow call in. This allows modem power to be turned on to allow call in at predictable times (Dynamic Parameter)
Name: CallWindows
Type: String
Range: 0 to 40 characters
Default: none
Example: CallWindows=string

Length of call window in minutes. -2=Unused, -1=Power always on, 0=No call-in power, X=minutes. Note that power bit is defined in the Rock GPIO module (Dynamic Parameter)
Name: WindowDuration
Type: int
Range: -2 to 240
Default: -2
Example: WindowDuration=-2

Warmup time in seconds after power is turned on, but before call is attempted. Power remains on for 2 seconds after completion of the call (Dynamic Parameter)
Name: WindowWarmup
Type: int
Range: 0 to 900
Default: 0
Example: WindowWarmup=0

Difference compression of the data stream
Name: Compress
Type: boolean
Default: true
Example: Compress=true

Buffer size of the simulated Altus ring buffer in 16kb blocks (64 = 1mb). Zero (0) means no streaming. NOTE: Will be disabled if modem functions used!
Name: Buffer
Type: int
Range: 0 to 65535
Default: 0
Example: Buffer=0

Primarily for use with Altus EVT archiver. Simulates the Altus naming convention by creating new EVT files with the naming style AA001.EVT. Applies ONLY to event recording. Continuously recorded data is produced in the YYYYMMDDHHMMSS.firstCh.STDID.evt format only. (Advanced) (Dynamic Parameter)
Name: AltusEVTStyle
Type: boolean
Default: true
Example: AltusEVTStyle=true

Dynamic packet sizing allows automatic sizing of packets for block file transfers to maximize transmission speed. If disabled, packets are fixed at 256 bytes. (Advanced)
Name: TXSize256
Type: choice
Choices: 0-Dynamic 2048,1-Fixed 256,2-Dynamic 4096
Default: 0-Dynamic 2048
Example: TXSize256=0-Dynamic 2048

Maximum size for RAM-based SDS ring buffer in KB. Above this number, the ring buffer is created on disk. (Advanced)
Name: SDSMaxRam
Type: int
Range: 0 to 64000
Default: 4000
Example: SDSMaxRam=4000

Mode 2 timeout value in packets. 0=Mode 1 (normal), -1=Mode 3 (handshake), 6-65535=Mode 2 (periodic continuations required) (Advanced)
Name: ModeTimeout
Type: int
Range: -1 to 65535
Default: 0
Example: ModeTimeout=0

Advanced serial port settings for data bits, parity, etc. (Default is 8 bits, no parity, 1 stop bit) (Advanced)
Name: ComSettings
Type: String
Range: 0 to 20 characters
Default: none
Example: ComSettings=string

CGS Altus Telemetry via TCP/IP

This module provides support for limited emulation of the Altus TCP/IP interface, including the Serial Data Streams (SDS) protocol, modem dial-out modes and command console. The primary purpose of this module is to allow customers with existing Altus units and software that communicates with them to have an easier transition requiring little or no software changes before eventual conversion to a more native interface.

Communication parameters and conditions are controlled through Rockhound parameters, and this class will support a very limited subset of the Altus command mode and block mode functions. Parameters can be read through the interface via an SDS parameter packet, but parameters cannot be sent back as a parameter packet. Block mode file transfers are supported.

Command mode supports a very limited command set, but does include most file operations, including TX and RX commands.

This module adds CGS specific support for the HOLD and SUCCESS commands.

Altus modem modes are nearly fully supported.

Category: DATARELAY
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or DATAINTEGRATOR_Output

Parameters added to module specific .cfg file:

TCP Port number for outgoing data, should be greater than 5000
Name: TCPPort
Type: int
Range: 5000 to 32767
Default: 9800
Example: TCPPort=9800

Altus password feature to block use of certain commands (Dynamic Parameter)
Name: Password
Type: String
Range: 0 to 80 characters
Default: none
Example: Password=string

List of digitizers:channels to be output, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

Enable modem use. When disabled, the connection is permanent and there's no dialing or modem control
Name: ModemEnable
Type: boolean
Default: false
Example: ModemEnable=false

Dial on triggered event if modem enabled (Dynamic Parameter)
Name: OnEvent
Type: boolean
Default: false
Example: OnEvent=false

Dial on daily checkin if modem enabled (Dynamic Parameter)
Name: OnCheckin
Type: boolean
Default: false
Example: OnCheckin=false

Dial on alarm activation if modem enabled (Dynamic Parameter)
Name: OnAlarm
Type: boolean
Default: false
Example: OnAlarm=false

Dial on loss of AC input if modem enabled (Dynamic Parameter)
Name: OnLostAC
Type: boolean
Default: false
Example: OnLostAC=false

Dial on low battery (less than 12VDC) if modem enabled (Dynamic Parameter)
Name: OnLowBatt
Type: boolean
Default: false
Example: OnLowBatt=false

Dial on loss of GPS (less than 80% clock quality) if modem enabled (Dynamic Parameter)
Name: OnLostGPS
Type: boolean
Default: false
Example: OnLostGPS=false

Dial on extreme temperature (less than -20c or more than +65c) if modem enabled (Dynamic Parameter)
Name: OnExtTemp
Type: boolean
Default: false
Example: OnExtTemp=false

Call must complete with a 'SUCCESS' command in order for the call to be considered successful, else will retry the call. (Dynamic Parameter)
Name: CallCompletion
Type: boolean
Default: false
Example: CallCompletion=false

Modem initialization string. Unused on a Rock and is instead specified by the TTY Monitor Service. If needed, use ttymonconfig from Linux to configure this service. (Dynamic Parameter)
Name: ModemSetupCmd
Type: String
Range: 0 to 40 characters
Default: AT&FL1E0&C1S0=1&W
Example: ModemSetupCmd=AT&FL1E0&C1S0=1&W

Modem Dialing prefix (Dynamic Parameter)
Name: ModemDialCmd
Type: String
Range: 0 to 40 characters
Default: ATDT
Example: ModemDialCmd=ATDT

Modem hangup string (Dynamic Parameter)
Name: ModemHangupCmd
Type: String
Range: 0 to 40 characters
Default: ATH
Example: ModemHangupCmd=ATH

Phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber1
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber1=string

Alternate phone number to dial when connecting to data center (Dynamic Parameter)
Name: PhoneNumber2
Type: String
Range: 0 to 40 characters
Default: none
Example: PhoneNumber2=string

Time of daily checkin in hours:minutes (00:00 - 23:59) (Dynamic Parameter)

Name: DailyCKITime
Type: String
Range: 0 to 5 characters
Default: none
Example: DailyCKITime=string

Daily checkin interval (0=Daily, 1=Skip one day) (Dynamic Parameter)
Name: DailyCKIDays
Type: int
Range: 0 to 15
Default: 0
Example: DailyCKIDays=0

Time to wait for a connection to the data center, in seconds (Dynamic Parameter)
Name: ConnectWait
Type: int
Range: 5 to 400
Default: 30
Example: ConnectWait=30

Count of number of retries before giving up on a call (Dynamic Parameter)
Name: RetryCount
Type: int
Range: 1 to 1000
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds (Dynamic Parameter)
Name: RetryDelaySec
Type: int
Range: 1 to 3600
Default: 30
Example: RetryDelaySec=30

Maximum delay between retries as retry interval is doubled, in seconds (Dynamic Parameter)
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

Space separated times of day (2:15 15:54) to allow call in. This allows modem power to be turned on to allow call in at predictable times (Dynamic Parameter)
Name: CallWindows
Type: String
Range: 0 to 40 characters
Default: none
Example: CallWindows=string

Length of call window in minutes. -2=Unused, -1=Power always on, 0=No call-in power, X=minutes. Note that power bit is defined in the Rock GPIO module (Dynamic Parameter)

Name: WindowDuration
Type: int
Range: -2 to 240
Default: -2
Example: WindowDuration=-2

Warmup time in seconds after power is turned on, but before call is attempted. Power remains on for 2 seconds after completion of the call (Dynamic Parameter)
Name: WindowWarmup
Type: int
Range: 0 to 900
Default: 0
Example: WindowWarmup=0

Difference compression of the data stream
Name: Compress
Type: boolean
Default: true
Example: Compress=true

Buffer size of the simulated Altus ring buffer in 16kb blocks (64 = 1mb). Zero (0) means no streaming. NOTE: Will be disabled if modem functions used!
Name: Buffer
Type: int
Range: 0 to 65535
Default: 64
Example: Buffer=64

Primarily for use with Altus EVT archiver. Simulates the Altus naming convention and archiver bit by creating new EVT files with the naming style AA001.EVT. Applies ONLY to event recording. Continuously recorded data is produced in the YYYYMMDDHHMMSS.firstCh.STDID.evt format only. (Advanced) (Dynamic Parameter)
Name: AltusEVTStyle
Type: boolean
Default: true
Example: AltusEVTStyle=true

Dynamic packet sizing allows automatic sizing of packets for block file transfers to maximize transmission speed. If disabled, packets are fixed at 256 bytes. (Advanced)
Name: TXSize256
Type: choice
Choices: 0-Dynamic 2048,1-Fixed 256,2-Dynamic 4096
Default: 0-Dynamic 2048
Example: TXSize256=0-Dynamic 2048

Maximum size for RAM-based SDS ring buffer in KB. Above this number, the ring buffer is created on disk. (Advanced)
Name: SDSMaxRam
Type: int
Range: 0 to 64000
Default: 4000
Example: SDSMaxRam=4000

Mode 2 timeout value in packets. 0=Mode 1 (normal), -1=Mode 3 (handshake), 6-65535=Mode 2 (periodic continuations required) (Advanced)
Name: ModeTimeout
Type: int
Range: -1 to 65535
Default: 0
Example: ModeTimeout=0

PPP Dial Generation

Module name: PPPDialer This module is used to cause connections via a modem connection via PPP.

PPP should be separately configured for a "flexible modem connection" using the pppconfig script from Linux.

In this mode, the modem will normally be in receive mode allowing for incoming calls for reasons such as manual file retrieval or system configuration. When stimulated by the PPPDialer module for the reasons specified, the PPP connection will dial out to establish a connection with a remote host for functions such as file transfer or ORB client mode with an Antelope system.

Category: DATARELAY
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Dial on triggered event (Dynamic Parameter)
Name: OnEvent
Type: boolean
Default: true
Example: OnEvent=true

Dial on SOH condition as determined by the SOH File Generator module (Dynamic Parameter)
Name: OnSOH
Type: boolean
Default: false
Example: OnSOH=false

Dial periodically for the purposes of checkin or to send continuously acquired data, in minutes. Set to zero to disable interval dialing. (Dynamic Parameter)
Name: OnInterval
Type: int
Range: 30 to 65535
Default: 0
Example: OnInterval=0

Maximum amount of time to attempt a connection before giving up, in minutes (Dynamic Parameter)
Name: MaxRetry
Type: int
Range: 30 to 65535
Default: 480
Example: MaxRetry=480

QSCD Packet Telemetry

Module name: QSCDPush This module is used to send selected channels of the data stream as QSCD formatted UDP packets to one or more QSCD hosts. The module operates in active mode, sending one packet for each of up to twelve three channel groups.

This module requires separate registration.

You will need to change your layout to produce two data streams, one for recording (say at 200sps) and one for QSCDPush, say at 20sps. To do this, you will need to completely rebuild the layout.

We recommend that you first save the current layout using the ./rhsave script.

When building the new layout, we suggest that you enable Advanced Modules, and then use the KMIAdvanced Simple Event Recorder and Telemetry layout so that the layout produces two data streams, one for recording and one for telemetry through QSCD.

To Configure the second data stream, set channel names for the second data stream. By default, channel names will be assigned as Cxx.

Change the channel names for the QSCDPush channels to something that helps you know that they are related to, but not the same channels. For example, something like “C1q” to represent the QSCDPush equivalent of “C1”:

Also, set the Sensitivity and Full Scale to the SAME VALUES as those used for the recording channels. Optionally, you can set Sensor Type, Gain, Natural Frequency, Damping, and so on to match, but these are not required.

Set the recording channel sample rate (for example, channels 1-12 set to 200sps), and the QSCDPush channels (for example, channels 13-24 set to the 20sps equivalents)

Configure the system so that it will NOT record the 20sps data stream. Go to the Altus Evt Archiver (or whatever you are using), and select to ONLY record the recording sample rate (for example, 200sps). If you do not set “Record Only”, you will get data recorded at BOTH 200sps and 20sps.

In the QSCDPush parameters, set the QSCD Host, which is the IP address of the QSCD server. Also set the UDP port to be used, the sample rate that matches the QSCD channels, and for each group set the channel IDs of three QSCD channels in a comma separated list. The QSCDPush module will send one UDP packet every second for each defined group.

NOTE that you can send data to more than one QSCD Host. To do so, specify multiple QSCD Hosts as a comma separated list.

To have the QSCDPush module compute channel correlation, define the correlation channels of two QSCD channels that will be sent. Both channels used in correlation computations MUST be defined and used in a QSCD group.

Category: DATARELAY
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output

Parameters added to module specific .cfg file:

Comma separated list of IP addresses of QSCD hosts. NOTE: Active mode only. Passive mode is not supported.
Name: Host
Type: String
Range: 1 to 512 characters
Default: none
Example: Host=string

UDP Port number connection to QSCD host (all QSCD host connections are made through the same UDP port)
Name: UDPPort
Type: int
Range: 2000 to 65535
Default: 9908
Example: UDPPort=9908

Sampling rate, in SPS. Note that in most cases, data will be recorded at one sample rate and send through QSCD at a second sample rate. See documentation.
Name: SPS
Type: choice
Choices: 10sps,20sps,50sps,100sps,200sps
Default: 20sps
Example: SPS=20sps

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup1
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup1=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr1
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr1=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup2
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup2=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr2
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr2=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup3
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup3=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr3
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr3=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup4
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup4=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr4
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr4=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup5
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup5=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr5
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr5=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup6
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup6=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr6
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr6=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup7
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup7=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr7
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr7=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup8
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup8=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr8
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr8=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup9
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup9=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr9
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr9=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup10
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup10=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr10
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr10=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup11
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup11=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr11
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr11=string

A comma separated list of three channel IDs used to prepare QSCD packets, e.g. C1,C2,C3. Channel order must be specified as ZNE.
Name: ChannelGroup12
Type: String
Range: 0 to 512 characters
Default: none
Example: ChannelGroup12=string

A comma separated list of two channel IDs used to specify channel correlation pairs, e.g. C1,C4. Channels must exist.
Name: GroupCorr12
Type: String
Range: 0 to 512 characters
Default: none
Example: GroupCorr12=string

Holdoff time in seconds for data good flag. Holdoff occurs after system startup, and after a functional test (such as FT or SRT) (Advanced)
Name: DataGoodHoldoff
Type: int
Range: 0 to 3600
Default: 30
Example: DataGoodHoldoff=30

Length of data window used for computations (Advanced)
Name: Window
Type: int
Range: 1 to 3600
Default: 10
Example: Window=10

Local mirror of a data source

Category: DATAMIRROR

Data Mirror modules duplicate data sent across a telemetry connection into local files.

An example is the SLinkMirror module, which duplicates data sent via the SLink interface into local continuously recorded MiniSEED files.

SEEDLink Stream Mirrored to Disk

The SLinkServer module is used to locally capture the data from a SLink telemetry module and to record the data locally in continuously recorded MiniSEED files.

Category: DATAMIRROR
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

IP address of SEEDLink server. If generated locally by this unit, use 127.0.0.1
Name: Host
Type: String
Range: 0 to 512 characters
Default: 127.0.0.1
Example: Host=127.0.0.1

TCP Port for SEEDLink server
Name: Port
Type: int
Range: 5000 to 65535
Default: 18000
Example: Port=18000

Directory to hold created MiniSeed files (Dynamic Parameter)
Name: OutputDir
Type: String
Range: 1 to 128 characters
Default: \data\events\
Example: OutputDir=\data\events\

Directory structure for how to store recorded files (Dynamic Parameter)
Name: DirLayout
Type: choice
Choices: FLAT,BYDATE,STATION,NETWORK
Default: FLAT
Example: DirLayout=FLAT

Use Julian day representation for indicating day within the year. e.g. February 5 would be indicated as 036 rather than 0205. (Dynamic Parameter)
Name: Julian
Type: boolean
Default: false
Example: Julian=false

File duration in seconds. If set to 3600, files will be blocked into approximate one hour files depending on where the MiniSEED packets start and end
Name: Duration
Type: int
Range: 1 to 28800
Default: 3600
Example: Duration=3600

Ring Buffer Server

Category: RBSERVER

The RBSERVER provides a way to store data from the front ends in a ring buffer for retrieval by an external program. Kinemetrics Rockhound conforms to the definition of the Ring Buffer as defined by Boulder Real Time Technologies for use with their Antelope real time monitoring systems.

An RBServer Rockhound module will accept data from one or more front ends and will place the data into a Ring Buffer that resides within Rockhound itself. This data is then made available to external systems by running a Ring Buffer Server on Rockhound so that external systems may access the data.

The data will be placed in this Ring Buffer in approximately the order that the data arrived from the front ends. There may be some variation from the exact order of arrival due to the multitasking nature of the Rockhound firmware, but the order should be essentially identical and the data itself will be unaffected.

Ring Buffer Server

Data from the various front ends is encoded into the GENC format, which is a compressed data source. As needed, the Rockhound RBServer module can be extended to encode data written to the Ring Buffer in other data formats.

The configuration of the RBServer allows for definition of the size of the Ring Buffer, the base port number used for Ring Buffer client connections, the number of simultaneous clients supported, and whether or not clients are allowed to write data into the Ring Buffer.

Note: To add an RBServer to your layout, use the "Insert a Module" action on the Advanced Features menu.

Category: RBSERVER
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or CHANNELOASISBRIDGE_Output
and/or RECORDER_Output

Parameters added to module specific .cfg file:

Ring Buffer Size in KB
Name: RBSizeKB
Type: int
Range: 0 to 16000000
Default: 10000
Example: RBSizeKB=10000

Directory to hold Ring Buffer file
Name: RBDir
Type: String
Range: 1 to 128 characters
Default: \data\rb\
Example: RBDir=\data\rb\

Number of clients that are allowed to simultaneously connect to the Ring Buffer
Name: NClients
Type: int
Range: 1 to 8
Default: 4
Example: NClients=4

TCP Port for Ring Buffer clients
Name: TCPPort
Type: int
Range: 5000 to 65535
Default: 9500
Example: TCPPort=9500

Remote Writes allowed to the unit's Ring Buffer (from other Ring Buffer clients)
Name: RemoteWrites
Type: boolean
Default: false
Example: RemoteWrites=false

Remote ORBServer host to connect to as a client (for client-mode connections to the ORBServer). e.g.: myserver.com or 10.0.0.1. If non-blank, the module will start a thread that tries to create and maintain this connection.
Name: RemoteHost
Type: String
Range: 0 to 512 characters
Default: none
Example: RemoteHost=string

TCP Port for remote host client connections
Name: RemotePort
Type: int
Range: 5000 to 65535
Default: 16002
Example: RemotePort=16002

Signer mechanism. Used to look up signing method and shared secret used for client connection authentication
Name: Signer
Type: String
Range: 0 to 512 characters
Default: invite
Example: Signer=invite

Enter host names here of trusted Ring Buffer clients, space separated. Blank entry here indicates all clients trusted
Name: TrustClients
Type: String
Range: 0 to 512 characters
Default: none
Example: TrustClients=string

Time in seconds between status packet entries put into the Ring Buffer. Set to zero to disable status entries.
Name: StatusInterval
Type: int
Range: 0 to 86400
Default: 30
Example: StatusInterval=30

Choose status of pf/st status packets, choose Antelope for Antelope compatible status packets, or OASIS for OASIS or KMI SOH GUI compatible status packets
Name: PFSTStyle
Type: choice
Choices: OASIS,Antelope
Default: OASIS
Example: PFSTStyle=OASIS

If set, causes the ring buffer to store only channels at the specified sample rate and SOH channels. This is provided for when you only want some channels to be put in the ring buffer.
Name: OnlySPS
Type: choice
Choices: Unused,1sps,10sps,20sps,50sps,100sps,200sps,250sps,500sps,1000sps,2000sps
Default: Unused
Example: OnlySPS=Unused

ANTELOPE MODE ONLY: Latency for SOH data added to the ORB. This can be used to trade off telemetry bandwidth and latency by packing more seconds of contiguous data into each ORB packet. Values of 0 or 1 provide minimum latency by generating one packet for each second. Higher values will more efficiently use available bandwidth, but at the expense of more latency.
Name: ORBSOHLatency
Type: int
Range: 0 to 64000
Default: 0
Example: ORBSOHLatency=0

ANTELOPE MODE ONLY: Latency for channel data added to the ORB. This can be used to trade off telemetry bandwidth and latency by packing more seconds of contiguous data into each ORB packet. Values of 0 or 1 provide minimum latency by generating one packet for each second. Higher values will more efficiently use available bandwidth, but at the expense of more latency.
Name: ORBDataLatency
Type: int
Range: 0 to 64000
Default: 0
Example: ORBDataLatency=0

Maximum size for RAM-based Ring Buffer in KB. Above this number, the Ring Buffer is created on disk. (Advanced)
Name: RBMaxRam
Type: int
Range: 0 to 64000
Default: 15000
Example: RBMaxRam=15000

Timed event alarm clock

Category: ALARMCLOCK

The ALARMCLOCK is used to cause an action in the system on a timed basis. ALARMCLOCK modules may be used to perform periodic checks, tests, or timed recording. Alarms initiate messages which are acted upon by other parts of Rockhound such as User Notifiers or the CommandConsole.

The ALARMCLOCK is used to cause an action in the system on a timed basis. ALARMCLOCK modules may be used to perform periodic checks, tests, or timed recording. Alarms initiate messages which are acted upon by other parts of Rockhound such as User Notifiers or the CommandConsole.

Alarm Clock

This module is used to generate timed alarms.

The module reads a set of configured times that will cause an alarm to occur at specified times according to DayOfWeek, DayOfMonth, TimeOfDay, or EveryXMinutes.

The alarm can be used to cause actions such as DailyCheckIn callouts or pages, or can be used to cause timed window recording or cellular call-in power on times.

When an alarm is triggered, this EventAlarmClock's "Reason" parameters will be broadcast to any listening modules. This would allow, for example, an EventAlarmClock to drive the DailyCheckin function of an AlphaNumericPager or SMSMessageSender module by sending a Notify Checkin that is handled by these "Notifier" modules. The Notifier modules watch for the broadcast of Argv0="Notify" and Argv1="Checkin", and then act accordingly. Please note that the "Reason" code is not processed directly by the EventAlarmClock itself, but is parsed into Argv0, Argv1 etc and passed on to the listening modules for their use.

The EventAlarmClock can also be used to generate timed recording by encoding a reason of "KBTRI", Keyboard Trigger, which would be interpreted by listening modules of an Event Recorder to cause impulse or designated length recording.

Parameters read for this class:

```
"DayOfWeek" - Space separated days of the week (M T W TH F SA SU)
"DayOfMonth" - Space separated days of the month (1 2 3 ... 31)
"TimeOfDay" - Space separated times of day (2:15 15:54)
"EveryXMinutes" - Minute interval between alarms.
  If used alone, one alarm will be generated immediately
  (assuming no conflict with the DayOfWeek or DayOfMonth parameters),
  and the next one generated the number of minutes specified from
  the current time. ()
"Reason" - Message to be sent when the alarm triggers.
  This message should be specified as a parameter structure, such
  as "Reason=Notify Checkin".
```

NOTE: EveryXMinutes parameter is not limited to small numbers. For example, it could be used to indicate alarms every 5 minutes, 360 minutes (6 hours), or 129600 minutes (90 days).

NOTE: If EveryXMinutes is used in conjunction with the TimeOfDay parameter, indicates minute intervals relative to the first TimeOfDay parameter, which will act as the base time. In this case, once the base time is set, the TimeOfDay parameters will be overridden and ignored.

Examples:

To get alarms Every 3 days at 2:16 pm:

TimeOfDay=14:16
EveryXMinutes=4320
Reason=Notify Checkin

To get alarms every Monday and Friday at 8:00 am:

TimeOfDay=8:00
DayOfWeek=M F
Reason=Notify Checkin

To get alarms once an hour on the hour:

TimeOfDay=12:00
EveryXMinutes=60
Reason=Notify Checkin

To get alarms on the first and 15th of the month at 8:00 am:

DayOfMonth=1 15
TimeOfDay=8:00
Reason=Notify Checkin

To do timed recording for 60 seconds at 8:00 am and 2:00pm every day:

TimeOfDay=8:00 14:00
Reason=KBTRI 60

Category: ALARMCLOCK
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Space separated days of the week (M T W TH F SA SU)
Name: DayOfWeek
Type: String
Range: 0 to 15 characters
Default: none
Example: DayOfWeek=string

Space separated days of the month (1 2 3 ... 31)
Name: DayOfMonth
Type: String
Range: 0 to 80 characters
Default: none
Example: DayOfMonth=string

Space separated times of day (2:15 15:54)
Name: TimeOfDay
Type: String
Range: 0 to 128 characters
Default: none
Example: TimeOfDay=string

Interval between alarms, in minutes (0=unused)
Name: EveryXMinutes
Type: int
Range: 0 to 99999999999
Default: 0
Example: EveryXMinutes=0

Message to be sent when the alarm triggers (only one per EventAlarmClock module)
Name: Reason
Type: String
Range: 0 to 80 characters
Default: Notify Checkin
Example: Reason=Notify Checkin

User notifier

Category: NOTIFIER

The NOTIFIER is used to send messages to a user for notification purposes. NOTIFIERs listen for notification messages sent by different Rockhound modules.

The format of the broadcast is `Argv0 Argv1` where "Argv0" = "NOTIFY" and "Argv1" is the reason.

A NOTIFIER module may use any one of several methods to contact the user, including but not limited to E-Mail, Pagers, and SMS messages.

E-Mail Message Sender

This module supports text e-mailing to a user via SMTP. This module is used for sending short e-mail notification messages about things like a new event, which can contain data elements such as peaks and trigger times. This module is not used for mailing recorded data files - for that function see the E-Mail File Sender module.

NOTE: To send e-mail to multiple users, create multiple e-mailer modules each with their own config. These multiple e-mailer modules will share a single common SMTP port.

NOTE: Many parameters are defaulted, so it should only be necessary to specify MailHost and ToUser. Other parameters (like Subject) may be specified as needed.

In addition: "Domain" is specified in hardware.cfg, and is used in constructing the e-mail address that the message comes from. UnitID@domain is used unless domain undefined, in which case will use just UnitID. In most cases, the domain will be required by your mail server.

NOTE: If you wish you can set up your own mail server to handle the e-mail messages, or you may select "Use KMI Relay" and you may relay your messages through the Kinemetrics relay. If you use the KMI Relay, several parameters such as Mail Host, From User, Password and Port are ignored and handled by the KMI Relay.

Broadcast objects must contain at least two arguments, "Notify" which identifies the broadcast as something to be handled by notification modules, and a reason such as "EventEnd", which is in turn used to look into the e-mailer's config to find a matching string which is a tokenized message representing the message to be sent when this reason occurs, such as:

```
EventEnd=^SMARTSId^: Triggered event of duration ^Duration^.
```

If the reason argument is not found, a reason "Other" is searched for. If "Other" is not found, the message is discarded. When the received message is found, all "^" delimited tokens are replaced by their actual values found in the RunTime Parameters, the broadcast data, or the local config.

Standard reasons are: Startup, EventStart, EventEnd, Alarm, Checkin, Other. This means that the e-mailer module's config file should contain lines like "reason=tokenized message" for each reason that is to be supported.

Messages that are found, but blank, are discarded.

If the message begins with "@", it specifies a text file that is to be opened, read, tokenized, and then transmitted. This allows longer messages that contain more information to be designed and to more closely fit the requirements of the end-user. For example:

```
EventEnd=@EventEndMsg.txt
```

An example config file:

```
MailHost=mail.myhost.com
ToUser=marsha@yourhost.com
Subject=Rockhound Test
Startup=^SMARTSId^: Restarted
EventStart=^SMARTSId^: This is my event start message
EventEnd=^SMARTSId^: This is my event end message
Alarm=This is my alarm message
Checkin=This is my checkin message
Other=This is my other message (Baud rate = ^BaudRate^)
```

Example: On "EventStart" reason being received, Rockhound "kmi" will send the message:

```
kmi: This is my event start message
```

For details on available config variables that can be tokenized into a message, see RunTime Parameters documentation.

Category: NOTIFIER
Publishes: Output
Subscribes to: NOTHING

Parameters added to hardware.cfg:

Domain name that the mail is coming from, like yourhost.com. Mail will be sent as coming from UnitID@yourhost.com.
Name: Domain
Type: String
Range: 0 to 512 characters
Default: none
Example: Domain=string

Parameters added to module specific .cfg file:

Use the KMI relay to send e-mail messages. If used, you DO NOT need to specify the Mail Host, From User, Password, or Port
Name: UseKMIRelay
Type: boolean
Default: true
Example: UseKMIRelay=true

SMTP Mail host. e.g.: mail.myhost.com. NOTE: Not needed if using the KMI Relay
Name: MailHost
Type: String
Range: 0 to 80 characters
Default: none
Example: MailHost=string

User that the mail is directed to. e.g.: marsha@yourhost.com
Name: ToUser
Type: String
Range: 0 to 80 characters
Default: none
Example: ToUser=string

User that the mail is coming from. If not specified, the system will use a combination of the Unit ID and the Domain, both found in the hardware parameters - such as userid@domain. NOTE: Not needed if using the KMI Relay
Name: FromUser
Type: String
Range: 0 to 80 characters
Default: none
Example: FromUser=string

ESMTP authentication user:password to be supplied to ESMTP authentication using AUTH LOGIN. NOTE: Not needed if using the KMI Relay
Name: Password
Type: String
Range: 0 to 80 characters
Default: none
Example: Password=string

Subject line for the message
Name: Subject
Type: String
Range: 0 to 80 characters
Default: none
Example: Subject=string

Count of number of retries before giving up on a message
Name: RetryCount
Type: int
Range: 1 to 1000
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds
Name: RetryDelaySec
Type: int
Range: 1 to 3600
Default: 30
Example: RetryDelaySec=30

Maximum delay between retries as retry interval is doubled, in seconds
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

String sent when unit restarts for any reason
Name: Startup
Type: String
Range: 0 to 512 characters
Default: none
Example: Startup=string

String sent when an event is detected
Name: EventStart
Type: String
Range: 0 to 512 characters
Default: none
Example: EventStart=string

String sent when an event is completed
Name: EventEnd
Type: String
Range: 0 to 512 characters
Default: none
Example: EventEnd=string

String sent when an alarm is detected
Name: Alarm
Type: String
Range: 0 to 512 characters
Default: none
Example: Alarm=string

String sent when a checkin is required
Name: Checkin
Type: String
Range: 0 to 512 characters
Default: none
Example: Checkin=string

String sent for other conditions
Name: Other
Type: String
Range: 0 to 512 characters
Default: none
Example: Other=string

Send any log messages that are received through this connection. Note this can result in a lot of messages.
Name: LogMsgs
Type: boolean
Default: false
Example: LogMsgs=false

Send any critical (error/warning) messages that are received through this connection. Note that this results in messages that are part of normal startup.
Name: CriticalMsgs
Type: boolean
Default: false
Example: CriticalMsgs=false

IP Port used for SMTP connections by the mail host. Default is 25, but may be changed by host for security purposes. NOTE: Not needed if using the KMI Relay
Name: Port
Type: int
Range: 1 to 32767
Default: 25
Example: Port=25

SMS Message Sender

This module supports SMS Message Sending.

NOTE: To send SMS messages to multiple destinations, create multiple SMSMessageSender modules each with their own config. These multiple modules may share a single common modem, or may operate through different modems.

On creation of the object, read configuration parameters from config as follows:

"PortName" - Name of the port to be used (COM1 or /dev/tty...)
"BaudRate" - Baud rate of the used port (9600)
"PortParams" - Port parameters used like 8 bits, no parity. See below.
"RetryCount" - Count of number of retries before giving up on a message (10)
"RetryDelaySec" - Number of seconds minimum between retries (10)
"MaxDelaySec" - Maximum delay (in seconds) between retries as retry interval is doubled (4 hrs)
"ModemSetupCmd" - Setup string sent to the modem (AT&FE0&C1S0=1&W)
"SetupCmd" - Setup string sent to set up SMS (AT+CMGF=0)
"ServiceCenterAddress" - Service Center Address (the SCA) (12099042030)
"DestinationAddress" - Destination Address (the DA or destination phone number) (121)
"TextMode" - Send message in text mode rather than PDU mode (false)

Port Parameters:

1st char - Data bits. Options for dataBits are 7 or 8.
2nd char - Parity. Options for parity are n (for none), e (for even), or o (for odd).
3rd char - Stop bits. Options for stop bits are 1 or 2.
4th char - Flow control. Options for flow control are n (for none), h (for hardware), s (for software xon/xoff) and u (for unchanged).

NOTE: Most parameters are defaulted, so it should only be necessary to specify PortName, DestinationAddress, and of course the tokenized message strings themselves. Other parameters may be specified as needed.

Broadcast objects must contain at least two arguments, "Notify" which identifies the broadcast as something to be handled by notification modules, and a reason such as "EventEnd", which is in turn used to look into the SMS sender's config to find a matching string which is a tokenized message representing the message to be sent when this reason occurs, such as:

```
EventEnd=^SMARTSId^: Triggered event of duration ^Duration^.
```

If the reason argument is not found, a reason "Other" is searched for. If "Other" is not found, the message is discarded. When the received message is found, all "^" delimited tokens are replaced by their actual values found in the RunTime Parameters, the broadcast data, or the local config.

Standard reasons are: Startup, EventStart, EventEnd, Alarm, Checkin, Other. This means that the SMS Message Sender module's config file should contain lines like "reason=tokenized message" for each reason that is to be supported. Messages are limited to 160 characters.

Messages that are found, but blank, are discarded.

An example config file:

```
PortName=Com1
ServiceCenterAddress=12099042030
DestinationAddress=12125551137
Startup=^SMARTSId^: Restarted
EventStart=^SMARTSId^: This is my event start message
EventEnd=^SMARTSId^: This is my event end message
Alarm=This is my alarm message
Checkin=This is my checkin message
Other=This is my other message (Baud rate = ^BaudRate^)
```

Example: On "EventStart" reason being received, Rockhound "kmi" will send a message to "12125551137" that contains:

```
kmi: This is my event start message
```

For details on available config variables that can be tokenized into a message, see RunTime Parameters documentation.

Category: NOTIFIER
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Name of the modem port, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: PortName
Type: String
Range: 1 to 20 characters
Default: /dev/ttyS1
Example: PortName=/dev/ttyS1

Parameters used to set up basic port parameters such as bits, parity, stop bits and flow control
Name: PortParams
Type: String
Range: 1 to 20 characters
Default: 7e1u
Example: PortParams=7e1u

Baud rate used to communicate with modem
Name: BaudRate
Type: choice
Choices: 2400,4800,9600,19200,38400,57600
Default: 19200
Example: BaudRate=19200

Modem setup string sent to the modem
Name: ModemSetupCmd
Type: String
Range: 0 to 40 characters
Default: AT&FE0&C1S0=1&W
Example: ModemSetupCmd=AT&FE0&C1S0=1&W

Setup string sent to set up SMS
Name: SetupCmd
Type: String
Range: 0 to 40 characters
Default: AT+CMGF=0
Example: SetupCmd=AT+CMGF=0

Service Center Address (the SCA). If stored in the modem, can be set to 00 or nothing
Name: ServiceCenterAddress
Type: String
Range: 0 to 40 characters
Default: 00
Example: ServiceCenterAddress=00

Send SMS messages in text mode. Not supported by all networks and devices. To use text mode, you must also change the setup command to use AT+CMGF=1 (use AT+CMGF=0 for the default PDU mode)
Name: TextMode
Type: boolean
Default: false
Example: TextMode=false

Destination Address (the DA, which is often the phone number to send the message to). NOTE: Do not use the '+' in the number - use alternatives, like '00' instead.
Name: DestinationAddress
Type: String
Range: 0 to 40 characters
Default: none
Example: DestinationAddress=string

Count of number of retries before giving up on a message
Name: RetryCount
Type: int
Range: 1 to 1000
Default: 10
Example: RetryCount=10

Minimum time between retries, in seconds
Name: RetryDelaySec
Type: int
Range: 1 to 3600
Default: 30
Example: RetryDelaySec=30

Maximum delay between retries as retry interval is doubled, in seconds
Name: MaxDelaySec
Type: int
Range: 10 to 345600
Default: 14400
Example: MaxDelaySec=14400

String sent when unit restarts for any reason
Name: Startup
Type: String
Range: 0 to 512 characters
Default: none
Example: Startup=string

String sent when an event is detected
Name: EventStart
Type: String
Range: 0 to 512 characters
Default: none
Example: EventStart=string

String sent when an event is completed
Name: EventEnd
Type: String
Range: 0 to 512 characters
Default: none
Example: EventEnd=string

String sent when an alarm is detected
Name: Alarm
Type: String
Range: 0 to 512 characters
Default: none
Example: Alarm=string

String sent when a checkin is required
Name: Checkin
Type: String
Range: 0 to 512 characters
Default: none
Example: Checkin=string

String sent for other conditions
Name: Other
Type: String
Range: 0 to 512 characters
Default: none
Example: Other=string

Send any log messages that are received through this connection. Note this can result in a lot of messages.
Name: LogMsgs
Type: boolean
Default: false
Example: LogMsgs=false

Send any critical (error/warning) messages that are received through this connection. Note that this results in messages that are part of normal startup.
Name: CriticalMsgs
Type: boolean
Default: false
Example: CriticalMsgs=false

File Forwarder

This module forwards files received from another unit using standard file senders.

Can be used to forward event files recorded by another unit. Primary goal was to forward files within an RS-232 interconnect network so that files recorded anywhere in the chain can be sent by FTP to one unit running this module who can then see the incoming files and re-broadcast them for transmission back to the data center.

The module watches files as they arrive in incoming directories from other units in a local network (usually sent by the remote unit's FTP sender). The module then moves them to an outgoing directory and broadcasts a message allowing the files to be sent by the receiving unit to a data center using modules such as the FTP File Sender or E-mail File Sender.

Category: NOTIFIER
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Directory that files come into
Name: InDir
Type: String
Range: 1 to 128 characters
Default: /data/incoming/
Example: InDir=/data/incoming/

Directory that files are moved to for sending
Name: OutDir
Type: String
Range: 1 to 128 characters
Default: /data/outgoing/
Example: OutDir=/data/outgoing/

Semicolon separated list of file extensions to scan
Name: FileExtensions
Type: String
Range: 1 to 128 characters
Default: m;evt
Example: FileExtensions=m;evt

Frequency to check for new files, in seconds
Name: ScanFrequency
Type: int
Range: 1 to 100000
Default: 30
Example: ScanFrequency=30

Interconnect facilities

Category: INTERCONNECT

Interconnect modules are used to interface one of more digitizers together to create a local system that operates together in specific ways.

Network Trigger

The Network Trigger module allows multiple Rockhound systems to perform common triggering. Rockhound layouts on the same subnet will discover each other automatically so that they can trigger each other as a total system.

The network trigger is a common way that Rock family digitizers (such as the Basalt or Granite) can trigger each other in a local network without additional cabling.

Category: INTERCONNECT
Publishes: Output
Subscribes to: VOTER_Output

Parameters added to module specific .cfg file:

Discover other units on the local network for network triggering
Name: Discovery
Type: boolean
Default: true
Example: Discovery=true

Indicates that this unit is a triggering slave, so it will respond to external trigger requests, but if this unit triggers, it will not cause other units to trigger. A triggering network may consist of multiple masters and multiple slaves, but must contain at least one triggering master. (Dynamic Parameter)
Name: Slave
Type: boolean
Default: false
Example: Slave=false

Trigger votes for external triggers (Dynamic Parameter)
Name: NetworkTriggerVotes
Type: int
Range: -1000 to 1000
Default: 1
Example: NetworkTriggerVotes=1

List of hosts to be specifically included for network triggering. A space separated list of IP addresses of units that need to common trigger, but are outside of the local network (and cannot be automatically discovered). List format is as follows: '123.12.0.2 123.12.0.3'. (Dynamic Parameter)
Name: Include1
Type: String
Range: 0 to 1024 characters
Default: none
Example: Include1=string

List of hosts to be specifically included for network triggering. A space separated list of IP addresses of units that need to common trigger, but are outside of the local network (and cannot be automatically discovered). List format is as follows: '123.12.0.2 123.12.0.3'. (Dynamic Parameter)
Name: Include2
Type: String
Range: 0 to 1024 characters
Default: none
Example: Include2=string

List of hosts to be specifically included for network triggering. A space separated list of IP addresses of units that need to common trigger, but are outside of the local network (and cannot be automatically discovered). List format is as follows: '123.12.0.2 123.12.0.3'. (Dynamic Parameter)
Name: Include3
Type: String
Range: 0 to 1024 characters
Default: none
Example: Include3=string

List of hosts to be specifically included for network triggering. A space separated list of IP addresses of units that need to common trigger, but are outside of the local network (and cannot be automatically discovered). List format is as follows: '123.12.0.2 123.12.0.3'. (Dynamic Parameter)
Name: Include4
Type: String
Range: 0 to 1024 characters
Default: none
Example: Include4=string

List of hosts to be specifically excluded from network triggering. A space separated list of IP addresses of units that should not be included in common triggering, and are inside of the local network (units outside of the local network will not be included unless specified). List format is as follows: '120.0.0.5 120.0.0.6'. (Dynamic Parameter)
Name: Exclude1
Type: String
Range: 0 to 1024 characters
Default: none
Example: Exclude1=string

List of hosts to be specifically excluded from network triggering. A space separated list of IP addresses of units that should not be included in common triggering, and are inside of the local network (units outside of the local network will not be included unless specified). List format is as follows: '120.0.0.5 120.0.0.6'. (Dynamic Parameter)
Name: Exclude2
Type: String
Range: 0 to 1024 characters
Default: none
Example: Exclude2=string

List of hosts to be specifically excluded from network triggering. A space separated list of IP addresses of units that should not be included in common triggering, and are inside of the local network (units outside of the local network will not be included unless specified). List format is as follows: '120.0.0.5 120.0.0.6'. (Dynamic Parameter)
Name: Exclude3
Type: String
Range: 0 to 1024 characters
Default: none
Example: Exclude3=string

List of hosts to be specifically excluded from network triggering. A space separated list of IP addresses of units that should not be included in common triggering, and are inside of the local network (units outside of the local network will not be included unless specified). List format is as follows: '120.0.0.5 120.0.0.6'. (Dynamic Parameter)
Name: Exclude4
Type: String
Range: 0 to 1024 characters
Default: none
Example: Exclude4=string

Network port used for Network Trigger discovery (Advanced)
Name: DPort
Type: int
Range: 5000 to 32767
Default: 9010
Example: DPort=9010

Network port used for Network Trigger In/Out messages (Advanced)
Name: TPort
Type: int
Range: 5000 to 32767
Default: 9011
Example: TPort=9011

General Purpose IO interface

Category: GPIO

The GPIO modules provide services for manipulating General Purpose Input/Output functions.

These modules accept broadcasts for system events such as threshold alarms and use these events to alter the outputs, which can then be used to drive other functions outside of the Kinemetrics system.

Rock GPIO

The RockGPIO module is used to translate system events, such as the Alarm Threshold into control of the Rock digitizer's output bits.

These bits are located on the optional dual serial cards. There are up to six output bits total (two per card). The bits are numbered 1 and 4 (rightmost slot), 2 and 5 (middle slot), 3 and 6 (leftmost slot).

Category: GPIO
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Output bit that is set when an alarm condition is detected. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: AlarmGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: AlarmGPIO=Unused

Alarm bit is to be inverted when output
Name: InvertAlarmGPIO
Type: boolean
Default: false
Example: InvertAlarmGPIO=false

Output bit that is set when events have been recorded (can be reset by clearing the event counter). Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: EventGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: EventGPIO=Unused

Event bit is to be inverted when output
Name: InvertEventGPIO
Type: boolean
Default: false
Example: InvertEventGPIO=false

Output bit that is set while the system is triggered. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: TriggerGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: TriggerGPIO=Unused

Trigger bit is to be inverted when output
Name: InvertTriggerGPIO
Type: boolean
Default: false
Example: InvertTriggerGPIO=false

Output bit that is set when external modem power is requested. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: ModemPwrGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: ModemPwrGPIO=Unused

Modem Power bit is to be inverted when output
Name: InvertModemPwrGPIO
Type: boolean
Default: false
Example: InvertModemPwrGPIO=false

Output bit set when there is an SOH condition. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: SOHGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: SOHGPIO=Unused

SOH bit is to be inverted when output
Name: InvertSOHGPIO
Type: boolean
Default: false
Example: InvertSOHGPIO=false

Output bit that is always set. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: Always1GPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: Always1GPIO=Unused

Always On Power bit 1 is to be inverted when output
Name: InvertAlways1GPIO
Type: boolean
Default: false
Example: InvertAlways1GPIO=false

Output bit that is always set. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: Always2GPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: Always2GPIO=Unused

Always On Power bit 2 is to be inverted when output
Name: InvertAlways2GPIO
Type: boolean
Default: false
Example: InvertAlways2GPIO=false

Output bit that is toggled for a heartbeat SOH condition. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: HeartbeatGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: HeartbeatGPIO=Unused

Name of the relay module interface serial port, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: PortName
Type: String
Range: 0 to 20 characters
Default: none
Example: PortName=string

NON-ROCK ONLY: Alarm duration (sec) before auto-reset. If zero, then latched and doesn't auto-reset. Note: This parameter is provided by the RockFrontEnd or MZD24FrontEnd modules, and as such this parameter here only applies to non-Rock or non-MZD24 digitizers. (Dynamic Parameter)
Name: Duration
Type: int
Range: 0 to 7200
Default: 0
Example: Duration=0

Baud rate used for communication (Advanced)
Name: BaudRate
Type: choice
Choices: 1200,2400,4800,9600,19200,38400,57600
Default: 9600
Example: BaudRate=9600

Parameters used to set up basic port parameters such as bits, parity, stop bits and flow control (Advanced)
Name: PortParams
Type: String
Range: 1 to 20 characters
Default: 8n1n
Example: PortParams=8n1n

Rock PGA GPIO

The PGAGPIO module is used to translate system events, such as the Alarm Threshold into control of the Rock digitizer's output bits.

These bits are located on the optional dual serial cards. There are up to six output bits total (two per card). The bits are numbered 1 and 4 (rightmost slot), 2 and 5 (middle slot), 3 and 6 (leftmost slot).

PGAGPIO can be used alone in a digitizer to control relays for power, SOH, event, trigger, heartbeat, three PGA based alarm levels, and an audible alarm output. There are also provisions for relay auto reset, relay cycling, and formatted message generation. The PGAGPIO and PGAGUI modules may also be used together in a PC to connect combined data on the PC with a supporting, but simple GUI.

Category: GPIO
Publishes: Output
Subscribes to: RECORDER_Output

Parameters added to module specific .cfg file:

Output bit that is set when an alarm level 1 condition is detected. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: Alarm1GPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: Alarm1GPIO=Unused

Alarm1 bit is to be inverted when output
Name: InvertAlarm1GPIO
Type: boolean
Default: false
Example: InvertAlarm1GPIO=false

Format is alarm duration (sec) before auto reset of the alarm or P:W where P is the on pulse time of the relay in seconds, then the relay is off for W seconds before the cycle repeats until the alarm is cleared. Example, to cause the relay to pulse on for 30 seconds and then repeat every 12 hours (43200 seconds), use 30:43200. Set this field to zero to turn the relay on until it is manually reset.
Name: Alarm1Cycle
Type: String
Range: 0 to 20 characters
Default: 0
Example: Alarm1Cycle=0

Output bit that is set when an alarm level 2 condition is detected. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: Alarm2GPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: Alarm2GPIO=Unused

Alarm2 bit is to be inverted when output
Name: InvertAlarm2GPIO
Type: boolean
Default: false
Example: InvertAlarm2GPIO=false

Alarm2 Trigger threshold as a percentage of full scale, percentage
Name: Alarm2Trigger
Type: double
Range: 0.001 to 100.000
Default: 10.0
Example: Alarm2Trigger=10.0

Format is alarm duration (sec) before auto reset of the alarm or P:W where P is the on pulse time of the relay in seconds, then the relay is off for W seconds before the cycle repeats until the alarm is cleared. Example, to cause the relay to pulse on for 30 seconds and then repeat every 12 hours (43200 seconds), use 30:43200. Set this field to zero to turn the relay on until it is manually reset.
Name: Alarm2Cycle
Type: String
Range: 0 to 20 characters
Default: 0
Example: Alarm2Cycle=0

Output bit that is set when an alarm level 3 condition is detected. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: Alarm3GPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: Alarm3GPIO=Unused

Alarm3 bit is to be inverted when output
Name: InvertAlarm3GPIO
Type: boolean
Default: false
Example: InvertAlarm3GPIO=false

Alarm3 Trigger threshold as a percentage of full scale, percentage
Name: Alarm3Trigger
Type: double
Range: 0.001 to 100.000
Default: 20.0
Example: Alarm3Trigger=20.0

Format is alarm duration (sec) before auto reset of the alarm or P:W where P is the on pulse time of the relay in seconds, then the relay is off for W seconds before the cycle repeats until the alarm is cleared. Example, to cause the relay to pulse on for 30 seconds and then repeat every 12 hours (43200 seconds), use 30:43200. Set this field to zero to turn the relay on until it is manually reset.
Name: Alarm3Cycle
Type: String
Range: 0 to 20 characters
Default: 0
Example: Alarm3Cycle=0

Output bit that is set when the selected alarm level condition is detected. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: AudibleGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: AudibleGPIO=Unused

Audible bit is to be inverted when output
Name: InvertAudibleGPIO
Type: boolean
Default: false
Example: InvertAudibleGPIO=false

Trigger level needed to trigger audible alarm
Name: Audible
Type: int
Range: 1 to 3
Default: 1
Example: Audible=1

Audible alarm (if enabled) pulses 3 times each minute until reset
Name: Pulsed
Type: boolean
Default: true
Example: Pulsed=true

Output bit set when there is an SOH condition. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: SOHGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: SOHGPIO=Unused

SOH bit is to be inverted when output
Name: InvertSOHGPIO
Type: boolean
Default: false
Example: InvertSOHGPIO=false

Format is alarm duration (sec) before auto reset of the alarm or P:W where P is the on pulse time of the relay in seconds, then the relay is off for W seconds before the cycle repeats until the alarm is cleared. Example, to cause the relay to pulse on for 30 seconds and then repeat every 12 hours (43200 seconds), use 30:43200. Set this field to zero to turn the relay on until it is manually reset.
Name: SOHCycle
Type: String
Range: 0 to 20 characters
Default: 0
Example: SOHCycle=0

Output bit that is set when events have been recorded (can be reset by clearing the event counter). Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: EventGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: EventGPIO=Unused

Event bit is to be inverted when output
Name: InvertEventGPIO
Type: boolean
Default: false
Example: InvertEventGPIO=false

Output bit that is set while the system is triggered. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: TriggerGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: TriggerGPIO=Unused

Trigger bit is to be inverted when output
Name: InvertTriggerGPIO
Type: boolean
Default: false
Example: InvertTriggerGPIO=false

Output bit that is always set. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: Always1GPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: Always1GPIO=Unused

Always On Power bit 1 is to be inverted when output
Name: InvertAlways1GPIO
Type: boolean
Default: false
Example: InvertAlways1GPIO=false

Output bit that is always set. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: Always2GPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: Always2GPIO=Unused

Always On Power bit 2 is to be inverted when output
Name: InvertAlways2GPIO
Type: boolean
Default: false
Example: InvertAlways2GPIO=false

Output bit that is toggled for a heartbeat SOH condition. Note that GPIO bits are on the internal dual serial option cards, and external relays are on an optional external relay board interfaced through RS-232.
Name: HeartbeatGPIO
Type: choice
Choices: Unused,1-GPIO bit 1,2-GPIO bit 2,3-GPIO bit 3,4-GPIO bit 4,5-GPIO bit 5,6-GPIO bit 6,7-External relay 1,8-External relay 2,9-External relay 3,10-External relay 4,11-External relay 5,12-External relay 6,13-External relay 7,14-External relay 8
Default: Unused
Example: HeartbeatGPIO=Unused

List of digitizers: channels to be processed, e.g. 'dig1:1, dig1:2' or '*'
Name: Channels
Type: String
Range: 1 to 1024 characters
Default: *
Example: Channels=*

Units used for PGA calculation and formatting. Note that g and cm selections only apply to accelerometers, and only if sensitivity selection is set correctly.
Name: PGAUnits
Type: choice
Choices: Volts,g,cm,gal
Default: g
Example: PGAUnits=g

Alarm message template. If blank, no message file will be created. If a template file is specified, it will define the structure of the created message files and can contain '^' delimited tokens from the Run Time Parameters.
Name: Message
Type: String
Range: 0 to 512 characters
Default: none
Example: Message=string

Number of files to keep. If zero, all files will be given the same name (MSG_NW_STA_SN.txt) and will be overwritten each time. If non-zero, file names will include a timestamp and will be automatically cleaned up (YYYYMMDDHHMMSS_MSG_NW_STA_SN.txt).
Name: FilesToKeep
Type: int
Range: 0 to 65000
Default: 0
Example: FilesToKeep=0

Directory to hold created message files
Name: MSGDir
Type: String
Range: 1 to 128 characters
Default: \data\msg\
Example: MSGDir=\data\msg\

File extension of created message files
Name: FileExtension
Type: String
Range: 1 to 128 characters
Default: txt
Example: FileExtension=txt

Name of the relay module interface serial port, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: PortName
Type: String
Range: 0 to 20 characters
Default: none
Example: PortName=string

Baud rate used for communication (Advanced)
Name: BaudRate
Type: choice
Choices: 1200,2400,4800,9600,19200,38400,57600
Default: 9600
Example: BaudRate=9600

Parameters used to set up basic port parameters such as bits, parity, stop bits and flow control (Advanced)
Name: PortParams
Type: String
Range: 1 to 20 characters
Default: 8n1n
Example: PortParams=8n1n

OASIS Display GUI

Category: OASISDISPLAYGUI

The OASIS display GUI module provides the GUI interface to an OASIS Structural Monitoring System, which is based on Rockhound. The display shows overall system and digitizer status. This GUI interface must run on a system that has a graphics display (such as a PC).

OASIS Display GUI (Desktop Only) (Advanced)

The OASIS GUI is added to the Rockhound layout as part of the OASIS structural monitoring system. The OASIS GUI is described in detail in the OASIS manual, p/n 300640.

Category: OASISDISPLAYGUI
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output
and/or CHANNELOASISBRIDGE_Output

OASIS Data bridge

Category: CHANNELOASISBRIDGE

The OASIS Data Bridge module combines the data from the original acceleration data channels with the derived velocity, displacement, and drift channels to create a new data stream representing all data in the system. This data is then in turn passed along to the OASIS GUI and drift trigger modules for possible system triggering and/or recording.

OASIS Data Bridge (Advanced)

Category: CHANNELOASISBRIDGE
Publishes: Output
Subscribes to: CHANNELPREEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output
and/or CHANNELOASISDRIFT_Output

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Sensitivity value for the channel in volts per unit, e.g. volts per g - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Sensitivity
Type: double
Range: 0.001 to 10000.0
Default: 1.25
Example: 'digitizer'.ch'chan'.Sensitivity=1.25

Full scale range value for the channel in +/- volts - needed for EVT,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.FullScale
Type: double
Range: 0.001 to 10000.0
Default: 2.5
Example: 'digitizer'.ch'chan'.FullScale=2.5

Sensor Type index for the channel (10=FBA-11, 11=FBA-4g, 12=FBA-2g, 13=FBA-1g, 14=FBA-0.5g, 15=FBA-0.25g, 16=FBA-0.1g, 20=FBA-23, 30=WR-1, 32=EpiSensor, 33=S6000, 34=Mark L22, 35=Mark L4C, 36=CMG, 37=CMG3T, 38=CMG40T, 39=CMG5, 40=KS-2000, 41=GT-S13, 42=CMG3ESP, 43=KMI-SH1, 44=KMI-SV1) - needed for EVT, SAC and COSMOS files
Name: 'digitizer'.ch'chan'.SensorType
Type: int
Range: 0 to 9999
Default: 32
Example: 'digitizer'.ch'chan'.SensorType=32

Sensor serial number for the channel
Name: 'digitizer'.ch'chan'.SensorSN
Type: int
Range: 0 to 99999
Default: 0
Example: 'digitizer'.ch'chan'.SensorSN=0

Sensor natural frequency for the channel, in Hz
Name: 'digitizer'.ch'chan'.NaturalFreq
Type: double
Range: 0 to 9999
Default: 200
Example: 'digitizer'.ch'chan'.NaturalFreq=200

Sensor damping for the channel (between 0 and 1)
Name: 'digitizer'.ch'chan'.Damping
Type: double
Range: 0 to 1
Default: 0.7
Example: 'digitizer'.ch'chan'.Damping=0.7

Gain value for the channel - needed for EVT,SUDS,SEISAN and COSMOS files
Name: 'digitizer'.ch'chan'.Gain
Type: int
Range: 1 to 5000
Default: 1
Example: 'digitizer'.ch'chan'.Gain=1

EpiSensor gain value, should be set to match the sensor's jumper settings (1=2.5V range, 2=5.0V, 4=10V, 8=20V)
Name: 'digitizer'.ch'chan'.EpiGain
Type: choice
Choices: 1,2,4,8
Default: 2
Example: 'digitizer'.ch'chan'.EpiGain=2

EpiSensor range code, where 1=4g, 2=2g, ... 5=0.25g - should be set to match the sensor's jumper settings
Name: 'digitizer'.ch'chan'.EpiRange
Type: choice
Choices: 1,2,3,4,5
Default: 1
Example: 'digitizer'.ch'chan'.EpiRange=1

EpiSensor Cal Coil value in g/V. This is a factory calibrated value
Name: 'digitizer'.ch'chan'.EpiCalCoil
Type: double
Range: 0.05 to 0.10
Default: 0.05
Example: 'digitizer'.ch'chan'.EpiCalCoil=0.05

Altitude value for the channel in degrees - needed for EVT,SAC and COSMOS files
Name: 'digitizer'.ch'chan'.Altitude
Type: int
Range: -90 to 90
Default: 0
Example: 'digitizer'.ch'chan'.Altitude=0

Azimuth value for the channel in degrees - needed for EVT,SAC,SUDS and COSMOS files
Name: 'digitizer'.ch'chan'.Azimuth
Type: int
Range: 0 to 360
Default: 0
Example: 'digitizer'.ch'chan'.Azimuth=0

Channel offset north value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetNorth
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetNorth=0

Channel offset east value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetEast
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetEast=0

Channel offset up value for the channel in meters
Name: 'digitizer'.ch'chan'.OffsetUp
Type: double
Range: -32000 to 32000
Default: 0
Example: 'digitizer'.ch'chan'.OffsetUp=0

Location code string for the channel - needed for EVT, MiniSEED files and/or Ring Buffer storage
Name: 'digitizer'.ch'chan'.LocationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.LocationCode=string

Network code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Network ID if not specified.
Name: 'digitizer'.ch'chan'.NetworkCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.NetworkCode=string

Station code string for the channel - needed for EVT, SAC, MiniSEED files and/or Ring Buffer storage. Defaults to the global Station ID if not specified.
Name: 'digitizer'.ch'chan'.StationCode
Type: String
Range: 0 to 80 characters
Default: none
Example: 'digitizer'.ch'chan'.StationCode=string

Calib value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calib
Type: double
Range: -1000000 to 1000000
Default: 0.0
Example: 'digitizer'.ch'chan'.Calib=0.0

Calper value for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.Calper
Type: double
Range: -9999 to 9999
Default: -1.0
Example: 'digitizer'.ch'chan'.Calper=-1.0

SegType for the channel - needed for Ring Buffer storage
Name: 'digitizer'.ch'chan'.SegType
Type: String
Range: 0 to 80 characters
Default: -
Example: 'digitizer'.ch'chan'.SegType=-

Number of ADC counts at +/- full scale, in counts
Name: 'digitizer'.ch'chan'.FullScaleADCCounts
Type: int
Range: 1 to 100000000
Default: 8388608
Example: 'digitizer'.ch'chan'.FullScaleADCCounts=8388608

Parameters added to module specific .cfg file:

Number of input physical channels from the data source
Name: NPhysicalChannels
Type: int
Range: 1 to 50
Default: 'physical channels'
Example: NPhysicalChannels='physical channels'

Number of output sources (channels) to be provided including AVD and drift channels
Name: NDigitizerChannels
Type: int
Range: 1 to 200
Default: 'digchannels'
Example: NDigitizerChannels='digchannels'

Mathematical integration of data (A-->V-->D)

Category: CHANNELOASISINTEGRATOR

The OASIS Integrator is a mathematical integrator that can be used to derive velocity and/or displacement from acceleration data. This module performs simple mathematical integration and is often combined with digital filters to produce more realistic estimations of velocity and/or displacement.

OASIS Mathematical Integrator (Advanced)

Category: CHANNELOASISINTEGRATOR
Publishes: Output
Subscribes to: CHANNELPREEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output

Computes drift between specified displacement channels

Category: CHANNELOASISDRIFT

The OASIS Drift modules compute the relative drift between two sensor channels.

OASIS Drift Computer (Advanced)

The simple drift module compares the relative displacement of two drift channels and outputs an additional data stream which represents this difference. This module looks only at the relative displacement between the two channels.

The drift data stream is eventually processed by a drift trigger to determine trigger status.

Category: CHANNELOASISDRIFT
Publishes: Output
Subscribes to: CHANNELPREEXTRACTOR_Output
and/or CHANNELDATASTREAMFILTER_Output

Parameters added to hardware.cfg:

User settable name of the digitizer
Name: 'digitizer'.Name
Type: String
Range: 1 to 80 characters
Default: 'digitizer'
Example: 'digitizer'.Name='digitizer'

Channel ID string for the channel
Name: 'digitizer'.ch'chan'.Id
Type: String
Range: 1 to 80 characters
Default: C'chan'
Example: 'digitizer'.ch'chan'.Id=C'chan'

Parameters added to module specific .cfg file:

Drift channel definition. Compares two drift channels by ID. Use the form C1ID:C2ID. Name of digitizer as an input channel from the original acceleration data source.
Name: Drift
Type: String
Range: 0 to 80 characters
Default: none
Example: Drift=string

Alternate drift level. Overrides drift levels specified in the Drift Trigger for this channel - used to allow different drift ratios for sections of the structure with different dynamic characteristics. ALL BLANK means unused - use standard drift level. If used, expressed as a percentage.
Name: AltDriftLevel1
Type: String
Range: 0 to 10 characters
Default: none
Example: AltDriftLevel1=string

Alternate drift level. Overrides drift levels specified in the Drift Trigger for this channel - used to allow different drift ratios for sections of the structure with different dynamic characteristics. ALL BLANK means unused - use standard drift level. If used, expressed as a percentage.
Name: AltDriftLevel2
Type: String
Range: 0 to 10 characters
Default: none
Example: AltDriftLevel2=string

Alternate drift level. Overrides drift levels specified in the Drift Trigger for this channel - used to allow different drift ratios for sections of the structure with different dynamic characteristics. ALL BLANK means unused - use standard drift level. If used, expressed as a percentage.
Name: AltDriftLevel3
Type: String
Range: 0 to 10 characters
Default: none
Example: AltDriftLevel3=string

OASIS Statistics generator

Category: OASISSTATISTICS

The OASIS Statistics generator produces statistics and other information from OASIS triggered events.

OASIS Statistics Generator

This module defines text describing each trigger level as well as spectral computations that can be optionally performed on triggered data. This information is then available for inclusion in e-mail messages.

Category: OASISSTATISTICS
Publishes: Output
Subscribes to: RECORDER_Output
and/or CONTINUOUSRECORDER_Output

Parameters added to module specific .cfg file:

Text description of each drift trigger level. (Dynamic Parameter)
Name: Level1
Type: String
Range: 1 to 256 characters
Default: Level1
Example: Level1=Level1

Text description of each drift trigger level. (Dynamic Parameter)
Name: Level2
Type: String
Range: 1 to 256 characters
Default: Level2
Example: Level2=Level2

Text description of each drift trigger level. (Dynamic Parameter)
Name: Level3
Type: String
Range: 1 to 256 characters
Default: Level3
Example: Level3=Level3

Compute spectral acceleration for this channel (use channel ID here), reports as OASISSA1 (Dynamic Parameter)

Name: SpectraChan1
Type: String
Range: 0 to 80 characters
Default: none
Example: SpectraChan1=string

Damping factor for spectral acceleration in percent (Dynamic Parameter)
Name: SpectraDamping1
Type: double
Range: 0 to 100
Default: 5
Example: SpectraDamping1=5

Period for spectral acceleration in seconds (Dynamic Parameter)
Name: SpectraPeriod1
Type: double
Range: 0.001 to 500
Default: 10
Example: SpectraPeriod1=10

Compute spectral acceleration for this channel (use channel ID here), reports as OASISSA2 (Dynamic Parameter)
Name: SpectraChan2
Type: String
Range: 0 to 80 characters
Default: none
Example: SpectraChan2=string

Damping factor for spectral acceleration in percent (Dynamic Parameter)
Name: SpectraDamping2
Type: double
Range: 0 to 100
Default: 5
Example: SpectraDamping2=5

Period for spectral acceleration in seconds (Dynamic Parameter)
Name: SpectraPeriod2
Type: double
Range: 0.001 to 500
Default: 11
Example: SpectraPeriod2=11

OASIS drift trigger

Category: OASISDRIFTTRIGGER

The OASIS drift trigger modules provide the ability to trigger the system based on drift ratio (relative displacement between sensors), and are used only with the OASIS structural monitoring system.

OASIS Drift trigger (Advanced)

This module computes the drift trigger ratio between two channels compared with the vertical spacing between the sensors. The drift values are computed previously by a drift module, and the vertical difference between the sensors is obtained from the sensor offset information.

The relative drift is divided by the vertical spacing of the sensors to obtain a drift ratio, which is then compared with multiple trigger thresholds for the purposes of generating drift alarms and to trigger recording.

Category: OASISDRIFTTRIGGER
Publishes: Output
Subscribes to: DATAINTEGRATOR_Output
and/or CHANNELTRIGGER_Output

Parameters added to module specific .cfg file:

Drift trigger level - ratio between drift values and channel vertical offsets (inter-story drift ratio). Expressed as a percentage.
Name: DriftLevel1
Type: double
Range: 0.000001 to 100
Default: 1
Example: DriftLevel1=1

Number of drift channels that must exceed threshold 1 to declare drift alarm 1
Name: DriftsVotes1
Type: int
Range: 1 to 128
Default: 2
Example: DriftsVotes1=2

Drift trigger level - ratio between drift values and channel vertical offsets (inter-story drift ratio). Expressed as a percentage.
Name: DriftLevel2
Type: double
Range: 0.000001 to 100
Default: 2
Example: DriftLevel2=2

Number of drift channels that must exceed threshold 2 to declare drift alarm 2
Name: DriftsVotes2
Type: int
Range: 1 to 128
Default: 2
Example: DriftsVotes2=2

Drift trigger level - ratio between drift values and channel vertical offsets (inter-story drift ratio). Expressed as a percentage.
Name: DriftLevel3
Type: double
Range: 0.000001 to 100
Default: 5
Example: DriftLevel3=5

Number of drift channels that must exceed threshold 3 to declare drift alarm 3
Name: DriftsVotes3
Type: int
Range: 1 to 128
Default: 2
Example: DriftsVotes3=2

Maximum votes contributed by acceleration triggers. Set to zero to disable acceleration triggers.
Name: MaxAccelVotes
Type: int
Range: 0 to 5000
Default: 0
Example: MaxAccelVotes=0

Trigger hold off delay in seconds to allow filters to settle (Advanced)
Name: TriggerHoldOff
Type: int
Range: 0 to 3600
Default: 90
Example: TriggerHoldOff=90

Propagation window for trigger detection, in milliseconds (Advanced)
Name: TriggerWindowMS
Type: int
Range: 0 to 5000
Default: 800
Example: TriggerWindowMS=800

OASIS Alarm controller

Category: OASISALARMS

The OASIS alarm module reflects the status of the OASIS system by sending information to an OASIS alarm panel.

OASIS Alarm controller module (Advanced)

The OASIS Alarms module drives an alarm panel that is connected via RS-232. A total of five relays are driven by this module. Four relays are connected to LEDs indicating not triggered, and trigger levels one through three. A fifth relay is used to drive an audible alarm.

Category: OASISALARMS
Publishes: Output
Subscribes to: NOTHING

Parameters added to module specific .cfg file:

Name of the alarm module interface port, e.g. COM1 (Windows) or /dev/ttySX (Linux/Unix)
Name: PortName
Type: String
Range: 1 to 20 characters
Default: COM2
Example: PortName=COM2

Trigger level needed to trigger audible alarm (4=Never) (Dynamic Parameter)
Name: Audible
Type: int
Range: 1 to 4
Default: 1
Example: Audible=1

Audible alarm (if enabled) pulses 3 times each minute until reset (Dynamic Parameter)
Name: Pulsed
Type: boolean
Default: true
Example: Pulsed=true

Alarm duration (sec) before auto-reset. If zero, then latched and doesn't auto-reset. Note: Auto-reset only clears the alarm relays and audible alert. (Dynamic Parameter)
Name: Duration
Type: int
Range: 0 to 7200
Default: 0
Example: Duration=0

User supplied software to be executed when a system trigger occurs. Program must be in the path (or the path must be specified) and will be passed the trigger level. (Dynamic Parameter)
Name: External
Type: String
Range: 0 to 100 characters
Default: none
Example: External=string

Baud rate used for communication (Advanced)
Name: BaudRate
Type: choice
Choices: 4800,9600,19200,38400,57600
Default: 9600
Example: BaudRate=9600

Parameters used to set up basic port parameters such as bits, parity, stop bits and flow control (Advanced)
Name: PortParams
Type: String
Range: 1 to 20 characters
Default: 8n1n
Example: PortParams=8n1n

Channel pre-extractor

Category: CHANNELPREEXTRACTOR

The CHANNELPREEXTRACTOR is used to separate the data of one channel from a digitizers data stream so that it may be processed independently of other channels.

Typically, this module is used before the DATAINTEGRATOR to allow preprocessing such as prefiltering before the data is fed to the DATAINTEGRATOR for possible later recording.

Channel Pre-Extractor

Category: CHANNELPREEXTRACTOR
Publishes: Output
Subscribes to: CHANNELDATASOURCE_Output

Data processing plug-ins

Category: PLUGIN

Plug-ins provide a way to customize a Rockhound module in limited, but very efficient ways for specialized purposes. A plug-in is not as simple a concept as Rockhound modules and is not as general purpose, but it can be a very fast and efficient way to process data in some cases.

A Plug-in layout is always associated with a Rockhound module, such as the DATAINTEGRATOR, and provides a way for the data stream to be quickly and efficiently routed out from the module - through the plug-in and then back into the module for further processing.

The clearest example of a plug-in is data filtering. Assume for example that the input data rate from the digitizer is at a sample rate of 200sps, but that data for certain channels is to be recorded at 10sps. This would be a good application for plug-ins where the data arriving at the DATAINTEGRATOR is passed out to the plug-ins where the affected channels are filtered appropriately and returned to the DATAINTEGRATOR while unaffected channels are simply returned without modification to the DATAINTEGRATOR. In either case, the data returned from the plug-ins is used throughout the rest of the Rockhound system as if the data had originally arrived this way.

Plug-ins can also be used for other purposes where it is necessary to tap off of the primary data stream, including things like reduction of the data to a lower sample rate before telemetry or specialized processing such as intensity calculations.

Plug-in layouts provide for an overall default processing method that can be applied to all channels, plus processing methods that may be specified for each individual channel. These can be combined to allow similar processing of all channels, special processing of each individual channel, non-processing of some channels, or processing of most channels one way and certain specific channels in another way.

The plug-in architecture allows for multiple stage processing of the data, for example using a multistage filter by passing the data through a series of defined filters.

For the default (all channels) and the individual channels, a list is provided of plug-in processing activities (such as filtering). Multiple plug-in processing activities can be supplied for each set of channels for each plug-in layout.

To add a plug-in layout to the system, you must follow these steps:

- Open the configuration by reading the layout from Rockhound.

- Add a plug-in layout to the list of available layouts. This is done using the "Manage plug-in layouts" selection from Advanced Features. Select the function to create a plug in layout, and give it an appropriate name.

- Edit the plug-in layout by selecting "Edit plug-in layouts" and define the plug-in processing activities to be performed for each group of channels.

- Edit the Rockhound parameters and locate the Rockhound module that will use the plug-in. Select the new plug-in layout from the pull-down list of available plug-ins layouts. The pull-down list will only show as options those plug-in layouts that you have previously defined.

Plug-ins are an advanced topic, and are more complex than configuring and operating basic Rockhound.

See the sections on Data Filtering and Advanced Features for more information.

Data Plug-in Layout

Please note that plug-ins are not Rockhound Modules, and can only be added to your layout by selecting them from the plug-in layout parameter of a Rockhound module that supports plug-ins. A plug-in cannot be added to your Rockhound layout as a module.

Parameters added to module specific .cfg file:

Default plug-ins used for all channels. If some channels are not to be processed, leave this value blank.
Name: Default
Type: multiselect
Default: none
Example: Default='plug-ins list'

Plug-ins for the specified digitizer and channel. Comma separated list of plug-ins to be used for this channel. Leave blank to use the default, else specify a list of plug-ins to override the default.
Name: 'digitizer'.ch'chan'
Type: multiselect
Default: none
Example: 'digitizer'.ch'chan'='plug-ins list'

6. Network Management

This chapter looks briefly at network management issues. This chapter gives suggestions on how to manage a network of units that may or may not be directly applicable to a given situation.

The purpose of this chapter is to present some suggestions for operating the network. The end user must make the final determination of what best suits their needs.

FTP Server Considerations

Installing an FTP Server on your system allows you to extend the capability of your Rockhound-based system significantly, allowing for capabilities like automatic recorded file upload and remote firmware and configuration updates.

Care should be taken to properly configure the FTP Server to minimize your susceptibility to attacks or abuse. Some useful configuration details include:

Disable anonymous logins to your FTP server and allow passworded logins only.

If possible, restrict accepted FTP connections to known addresses or known network masks (such as those through your ISP only).

Restrict uploaded files to only certain types - For example, allow only expected waveform data and text files (which would include status files from the instruments).

Create a "root" directory for each FTP login account to make it difficult for an attacker to "back up" within your directory structure, accessing sensitive areas of your system.

Put the FTP Server outside of the rest of your network with a firewall between the FTP Server and your main network. Do not run the FTP Server software on your main server.

Using existing Altus recorders with Rockhound

Some customers may have existing networks of Kinemetrics Altus recorders deployed that have significant useful service life left in them. The Rockhound design allows for use of these units within the Rockhound network topology.

To continue to use the Altus units, they can be reconfigured to operate as digitizers, sending their data to a corresponding Rockhound Altus front end module so that their data may be processed and treated very similar to data coming from a Q330.

Once the Altus data is transferred into Rockhound, it can be processed and stored in much the same way as data from a Q330, including continuous or event recording, choices of several recording formats, and all of the IP aware functions of Rockhound.

Although there are no firm plans at this point, it is also possible to create front end modules for earlier Quanterra digitizers, so that those may be used in a network based on Rockhound technology.

Delivery of recorded files

The primary intended method of file delivery is via FTP, although e-mail transmission of recorded file is also supported.

For FTP transfers, Rockhound provides for two primary methods of FTP file transfer:

One method is the "push" method, where files are pushed from Rockhound after recording to the user's FTP site for storage. This is done by using an FTPSender module in the Rockhound layout. The user is responsible for setting up and maintaining the FTP site.

The second method is the "pull" method, where files are pulled from Rockhound by the FTP site. This can be done automatically by polling Rockhound from the FTP site, or can be done manually or automatically from the FTP site when the notification has been received that new data is available.

Notifying the user from Rockhound

Rockhound may be set up to notify the user when certain important events occur. Several Notifier modules are available in Rockhound that can be used to notify a user via e-mail, SMS, or Pager.

Notification can be made for any of several reasons:

- On startup: Useful to notify the user when Rockhound restarts for any reason. This can be a restart due to a firmware or configuration update, among other reasons. Since restarts should be infrequent, this notification could serve as confirmation to user activities such as firmware upgrades, or as early warning of problems needing attention.
- Event detected: Sent when the unit detects a new event (at the point of trigger). This can be used as a first notification of a trigger when details are not necessary.
- Event completed: Sent when the unit finishes recording an event (at the point of detrigger). This can be used to provide details after recording is complete, where it is necessary to know the details what are available only after the event is complete (such as peaks, duration, or frequency content).
- On Alarm: Sent when an alarm level is detected. As of this writing, this is unimplemented.
- On Checkin: Sent on periodic (Daily/Weekly/Monthly) checkin. Can be used to help confirm proper operation of Rockhound and/or the hardware.

Notification can be useful when it is necessary to alert certain individuals of important events generated by or detected by Rockhound. Multiple Notifier modules may be set up to alert different individuals for different reasons.

Upgrading Rockhound firmware

Rockhound may be upgraded from time to time by Kinemetrics. For this reason, a plan should be set up for dealing with the process of upgrading this firmware.

Firmware updates will be posted by Kinemetrics on their FTP site, and can be used add additional features, or to implement design changes or corrections.

Firmware upgrades can be made using ROCKTalk's "Firmware Update" selection, which is made from the "Setup" menu. Using this method, the user may select the firmware JAR file to be sent, and may select from a list of units to be updated.

ROCKTalk's firmware update process will contact each unit, and will log into the console of each unit (using all valid passwords) and will determine where the firmware input directory is located on that unit. It will then log into the unit's FTP connection and will transfer the Rockhound firmware update to the proper directory.

After validating the correctness of the firmware image, the unit will save the previous version of the firmware in a file called "update.jar.prev", and will then install and start the new firmware version.

You may choose to only upgrade a few units on your network at a time until you understand the behaviors of the new firmware before going live across the entire network.

It is also possible for you to write your own FTP transfer mechanism to transfer firmware and configuration updates. To do this, you would take a firmware JAR file, and FTP it to several units into their "injar" directories. Although firmware updates may be sent to multiple units, configuration data should not. Be certain that you do not send the same configuration information to more than one unit.

Whatever you call them on your own system, a firmware update sent to a unit should be sent to the "injar" directory and should be called "ftpupdate.jar". If you follow this naming convention, Rockhound will recognize the existence of the file within 10 minutes, and will validate the firmware image and install it if it is a good image.

Kinemetrics can provide you some examples as needed to help you with building your own FTP firmware or configuration updating mechanism.

Upgrading Rockhound configuration

The configuration of Rockhound may be changed from time to time by the customer. For this reason, a plan should be set up for dealing with the process of making and managing these configuration changes.

Configuration changes can be made using ROCKTalk's "Open Layout" and "Save Layout" selections, which are made from the "File" menu. Using these methods, the user may change the configuration by getting it from a unit or from a file, changing it, and then saving it to a file or directly back to a unit to be updated.

ROCKTalk's configuration sending process will contact the selected unit, and will log into the console of the unit (using all valid passwords) and will determine where the configuration input directory is located. It will then log into the unit's FTP connection and will transfer the revised configuration to the proper directory.

After validating the correctness of the configuration data, the unit will save the previous version of the configuration in a file called "config.jar.prev", and will then install the configuration and restart the unit with the changes.

It is also possible for you to write your own FTP transfer mechanism to transfer firmware and configuration updates. To do this, you would take a configuration JAR file, and FTP it to the correct unit into the "injar" directory. Although firmware updates may be sent to multiple units, configuration data should not. Be certain that you do not send the same configuration information to more than one unit.

Whatever you call them on your own system, a configuration file sent to a unit should be sent to the "injar" directory and should be called "ftpconfig.jar". If you follow this naming convention, Rockhound will recognize the existence of the file within 10 minutes, and will validate and install it if it is a good image.

Kinemetrics can provide you some examples as needed to help you with building your own FTP firmware or configuration updating mechanism.

7. Troubleshooting

This chapter looks at troubleshooting issues. This is not a "how to" or a Frequently Asked Questions area - that is covered in another chapter of this manual.

The purpose of this chapter is to examine some potential problems with Rockhound configuration or operation and suggest some possible solutions.

Rockhound Starts and Crashes in a Loop

Because of how Rockhound is designed, it runs within a batch or script file that is structured as a loop. The theory is that Rockhound runs the requested layout and configuration, and when a change is made, Rockhound is terminated and the loop restarts Rockhound so that the changes can take effect.

If there is a problem that causes Rockhound to crash, then the loop will restart Rockhound.

In the case of the stray mysterious hardware or software problem, this is a good safety net as it causes Rockhound to restart again and can serve to minimize the impact of what would otherwise be a minor problem with catastrophic results regarding the performance of Rockhound.

However, there are some situations that could cause the safety net to get "stuck". For example, if there were some unforeseen invalid combination of Rockhound modules and/or parameters that were to cause the Rockhound code to exit or crash soon after starting, then the result would be that Rockhound would start, and crash, and start, and crash, and start...

Unfortunately, it is difficult for the Rockhound firmware to detect or do anything about this. So it falls to the user to correct it.

Symptoms:

Cannot communicate with the unit via the CommandConsole, as Rockhound does not stay running long enough to keep the CommandConsole alive for communication.

Unit's computer can still communicate via FTP, as this is independent of the Rockhound firmware.

If communication with the unit's computer console (Note: NOT the CommandConsole) is possible, then the Rockhound firmware can be seen to be starting and crashing.

Solutions:

More than likely, the problem comes from an unforeseen invalid combination of Rockhound modules and/or parameters. In this case, the easiest thing to do is to eliminate the suspect configuration and restore the system to a known good configuration that at least allows reliable communication.

One way to do this is to restore an earlier known good configuration. Since this cannot be done through ROCKTalk because the Rockhound firmware is not running (at least not well) then what is needed is to do this through other means. An FTP connection to the unit's computer might be the easiest, but it may also be possible to make a TELNET connection to the unit's computer if it is configured to support TELNET.

If a previous configuration exists as a JAR file, name it something like "replace.jar" and transfer it to the unit's SMARTSDist/injar directory. Once completely transferred, rename the file to "config.jar". Next time Rockhound loops around and restarts, it will see this "new" configuration and use it - hopefully resolving the crash.

If a previous configuration isn't available to use, create one using ROCKTalk's Layout Wizard, and then archive it to a JAR file - then follow the procedure outlined above.

Finally, if a replacement configuration isn't available, then to just get Rockhound communicating again, delete the "config.jar" file from the SMARTSDist/config directory. When Rockhound next loops around and restarts, it will interpret the absence of this file as meaning that there is no valid configuration, and it will revert to a "Console Only" configuration that contains a Rockhound CommandConsole module and nothing else. After this, communication with Rockhound should again be possible using ROCKTalk.

A final option would be to connect to the unit's computer console directly or via TELNET and terminate Rockhound manually. Once this is done, use one of the above methods to restore a working configuration, and then restart Rockhound.

Rockhound Stops Working After 12 Hours

The most likely cause of this is that the Rockhound registration information is missing, damaged, or invalid. In this case, Rockhound will revert to "Demo" mode and run an otherwise fully functional configuration for 12 hours. At the end of the 12 hour demo period, Rockhound will stop functioning and must be restarted manually.

Symptoms:

Everything works correctly in Rockhound, but the Rockhound firmware quits functioning after 12 hours.

Look at the SMARTSDist/SMARTSLog.txt file. Down toward the end of the file it will probably contain something like this:

```
Warning: Missing or invalid registration.
Demo Mode: Rockhound will halt in 12 hours!
```

Solutions:

Use ROCKTalk to examine and/or replace the registration information for Rockhound. Hopefully, a copy of the registration information has been saved that can be resent to the unit.

If after examining the registration information no problem is found, or if there is any trouble installing a correct registration file, then contact Kinemetrics for assistance.

Advanced Features not Accessible

Some features of ROCKTalk are more complex and are not recommended for use by all users.

ROCKTalk implements two levels of restriction to try and limit access to the more complex functions. Control of these levels is left up to the user.

Symptoms:

When selecting the Advanced Features function of ROCKTalk, a message "Sorry - Advanced Users Only" is displayed.

When attempting to enable Advanced Features from the ROCKTalk Setup dialog, a password is requested that is now known.

After enabling Advanced User status, some advanced features such as Level of Debug or Module Rename result in a message "requires special user privilege".

Solutions:

Advanced Features are enabled via the ROCKTalk Setup dialog. Select Advanced User Privileges.

If a password is requested, it has been set by the user. Kinemetrics does not put a password on Advanced User status by default. If the password can't be determined, contact whoever set up the ROCKTalk installation, or contact Kinemetrics for assistance.

Special User Privileges are set by setting values in the Advanced User Level field of the ROCKTalk Setup dialog. The levels are described in the section on ROCKTalk Setup.

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